

Appendix A – Other Regulatory Permits and Requirements That May Apply to Projects

The information in this appendix is provided to help the site designer comply with other regulations which may apply to the project or business. Some of the state regulations are summarized for your convenience. Because of the continuing modification of statutes, regulations, and county ordinances, a listing of relevant regulations is provided but should be verified. It is the design engineer's responsibility to obtain the current version of any ordinances, statutes, or regulations that apply to the project.

- R.1 Industrial Stormwater Permits (Ecology)
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This section describes some of the local, state, and federal regulations and permits that may apply to a project depending on the nature of the project and site characteristics. City of Everett staff is available to help in determining which permits apply and helping project applicants through the permitting process.

The Joint Aquatic Resources Permit Application (JARPA) is a resource that can help to streamline the environmental permitting process for outside agency permits. As noted in the following sections, several of the permits described in this section are included in the JARPA, so they can be covered under a single permit application. Refer to the Access Washington, one-stop e-permitting website for more information:

<http://epermitting.org>

R.1 Industrial Stormwater Permit (i.e., NPDES and State Waste Discharge Baseline General Permit for Stormwater Discharges Associated With Industrial Activities)

The NPDES program requires industries or industrial-type activities to obtain permits for stormwater discharge.

The Environmental Protection Agency's (EPA) National Pollutant Discharge Elimination System Permit (NPDES) regulations for stormwater (40 CFR Parts 122, 123, and 124) became effective on November 16, 1990. Because Washington is an NPDES delegated state, it issues NPDES permits for designated industries, construction sites, and municipalities.

Industrial Stormwater Permits:

USEPA regulations list certain industrial activities (Reference: 40 CFR 122.26(b)(14) which may need to have a stormwater discharge permit. The following categories (1 through 10) of facilities are considered to be engaging in "industrial activity." They are required by EPA to have a stormwater NPDES permit if they have a stormwater discharge to surface water.

- 1) Facilities subject to stormwater effluent limitations guidelines, new source performance standards, or toxic pollutant effluent standards under 40 CFR subchapter N (except facilities with toxic pollutant effluent standards under category 11 below).
- 2) Facilities classified by the Standard Industrial Classification (SIC) system as:
 - 24 - Lumber and Wood Products except Furniture (except 2434- Wood Kitchen Cabinets)
 - 26 - Paper and Allied Products (except 265-Paperboard Containers and Boxes, and except 267-Converted Paper and Paperboard Products except Containers and Boxes)
 - 28 - Chemicals and Allied Products (except 283-Drugs; and 285- Paints, Varnishes, Lacquers, Enamels, and Allied Products)
 - 29 - Petroleum Refining and Related Industries
 - 311- Leather Tanning and Finishing
 - 32 - Stone, Clay, Glass and Concrete Products (except 323-Glass Products, made of Purchased Glass)
 - 33 - Primary Metal Industries
 - 3441 - Fabricated Structural Metal Products
 - 373- Ship and Boat Building and Repair
- 3) Facilities classified by the Standard Industrial Classification (SIC) system as:
 - 10 - Metal Mining
 - 12 - Coal Mining
 - 13 - Oil and Gas Extraction
 - 14 - Mining and Quarrying of Nonmetallic Minerals, except Fuels (Includes active or inactive mining operations (except for areas of coal mining operations no longer meeting the definition of a reclamation area under 40 CFR 434.11(1) or except for areas of non-coal mining operations which have been released from applicable state or federal reclamation requirements by December 17, 1990) and oil and gas exploration, production, processing or treatment operations, or transmission facilities that discharge storm water that has come into contact with any overburden, raw material, intermediate products, finished products, byproducts or waste products located on the site of such operation.
- 4) Hazardous waste treatment, storage, or disposal facilities, including those that are operated under interim status or a permit under subtitle C of RCRA.

- 5) Landfills, land application sites and open dumps that receive or have received any industrial wastes (waste that is received from any of the facilities described under this subsection) including those that are subject to regulation under subtitle D of RCRA.
- 6) Facilities involved in the recycling of materials including metal scrap yards, battery reclaimers, salvage yards and automobile junkyards, including but not limited to those classified as SIC 5015-Wholesale Trade Activities of Motor Vehicle Parts, Used; and SIC 5093-Scrap and Waste Materials.
- 7) Steam electric power generating facilities, including coal-handling sites.
- 8) Transportation facilities classified under the following SIC codes, which have vehicle maintenance shops, equipment-cleaning operations, and airport deicing operations. (Only those portions of the facility involved in the above activities, or which are otherwise identified in one of the other 10 categories.)
 - 40 - Railroad Transportation
 - 41 - Local and Suburban Transit and Interurban Highway Passenger Transportation
 - 42 - Motor Freight Transportation and Warehousing (except 4221- Farm Product Warehousing and Storage, 4222-Refrigerated Warehousing and Storage, and 4225-General Warehousing and Storage)
 - 43 - United States Postal Service
 - 44 - Water Transportation
 - 45 - Transportation by Air
 - 5171- Petroleum Bulk Stations and Terminals
- 9) Treatment works treating domestic sewage or any other sewage sludge or wastewater treatment device or system, used in the storage treatment, recycling, and reclamation of municipal or domestic sewage, including land dedicated to the disposal of sewage sludge that are located within the confines of the facility, with a design flow of 1.0 MGD or more, or required to have an approved pretreatment program under 40 CFR part 403. Not included are farm lands, domestic gardens or lands used for sludge management where sludge is beneficially reused and which are not physically located in the confines of the facility, or areas that are in compliance with section 405 of the Clean Water Act.
- 10) Construction activity including clearing, grading and excavation activities except: operations that result in the disturbance of less than one acre of total land area which are not part of a larger common plan of development or sale. (See “Construction Stormwater Permits” below)
- 11) Facilities under the following SIC classifications need to apply for a stormwater NPDES permit only if they are engaged in an “industrial activity” which is exposed to stormwater and they have a point source stormwater discharge to surface water.
 - 20 - Food and Kindred Products
 - 21 - Tobacco Products
 - 22 - Textile Mill Products
 - 23 - Apparel and Other Finished Products made from Fabrics and Similar Materials Wood Kitchen Cabinets
 - 25 - Furniture and Fixtures
 - 265 - Paperboard Containers and Boxes

- 267 - Converted Paper and Paperboard Products, Except Containers and Boxes
- 27 - Printing, Publishing and Allied Industries
- 283 - Drugs
- 285 - Paints, Varnishes, Lacquers, Enamels, and Allied Products
- 30 - Rubber and Miscellaneous Plastic Products
- 31 - Leather and Leather Products (except 311, Leather Tanning and Finishing)
- 323 - Glass Products made of Purchased Glass
- 34 - Fabricated Metal Products, Except Machinery and Transportation Equipment (except 3441, Fabricated Structural Metal Products)
- 35 - Industrial and Commercial Machinery and Computer Equipment
- 36 - Electronic and Other Electrical Equipment and Components, Except Computer Equipment
- 37 - Transportation Equipment (except 373, Ship and Boat Building and Repair)
- 38 - Measuring, Analyzing, and Controlling Instruments, Photographic, Medical and Optical Goods, Watches and Clocks
- 39 - Miscellaneous Manufacturing Industries
- 4221 - Farm Product Warehousing and Storage
- 4222 - Refrigerated Warehousing and Storage
- 4225 - General Warehousing and Storage

For the industries identified in SIC categories (1) through (10), a permit is necessary if there is a point source stormwater discharge to a surface water, storm drain which discharges to surface water directly or indirectly, or a municipal storm sewer from any of the following areas of industrial activity: industrial plant yards; immediate access roads and rail lines used or traveled by carriers of raw materials, manufactured products, waste material, or by-products used or created by the facility; material handling sites; refuse sites; sites used for the application or disposal of process waste waters (as defined at 40 CFR part 401); sites used for the storage and maintenance of material handling equipment; sites used for residual treatment, storage, or disposal; shipping and receiving areas; manufacturing buildings; storage areas (including tank farms) for raw materials, and intermediate and finished products; and areas where industrial activity has taken place in the past and significant materials remain and are exposed to storm water.

Industries in Categories 1 through 9 can submit an application and qualify for a Conditional “No Exposure” Certificate

For the industries identified in SIC category (11), a permit is required for point source discharges from any of the areas that are listed above (except access roads and rail lines of SIC category 11 industries), only if material handling equipment or activities, raw materials, intermediate products, final products, waste materials, by-products, or industrial machinery are exposed to stormwater. However, they must submit a “No Exposure” Certificate to be excused from the permit.

Businesses subject to the Baseline General Permit for Stormwater Discharges Associated with Industrial Activities have to prepare and implement an Industrial Stormwater Pollution Prevention Plan (SWPPP) in accordance with the terms of that permit. The current permit was issued in August 2002, and modified in December 2004. Ecology expects to issue the new permit in 2009. Refer to Ecology’s website for updates:

<http://www.ecy.wa.gov/programs/wq/stormwater/industrial>

R.2 Construction Stormwater Permit (i.e., NPDES and State Waste Discharge General Permit for Stormwater Discharges Associated with Construction Activity)

Construction sites that will disturb 1 acre or more (or that are part of a larger common plan of development or sale that will disturb an acre or more of land) and that will have a discharge of stormwater from the project site to surface water must apply for Ecology's construction stormwater permit. Developers must file a Notice of Intent with Ecology and develop a Construction Stormwater Pollution Prevention Plan (SWPPP) prior to beginning construction. It is the responsibility of the project applicant to contact Ecology to determine if these or other requirements apply to their project.

However, to minimize review time and effort by both the project applicant and the City, the Construction Stormwater Pollution Prevention Plan (SWPPP) required by the City has been structured to be consistent with Ecology's SWPPP requirements. A SWPPP developed to meet Ecology requirements will also fulfill the City's requirement for a C-SWPPP under Minimum Requirement #2.

R.3 Endangered Species Act

With the listing of multiple species of salmon as threatened or endangered across much of Washington, and the probability of more listings in the future, implementation of the requirements of the Endangered Species Act will have a dramatic effect on urban stormwater management. The manner in which that will occur is still evolving. Provisions of the Endangered Species Act that may apply directly to stormwater management include the Section 4(d) rules, Section 7 consultations, and Section 10 Habitat Conservation Plans (HCP).

The Ecology manual has more information on stormwater-related concerns associated with the Endangered Species Act.

R.4 Section 401 Water Quality Certifications (included in JARPA)

For projects that require a fill or dredge permit under Section 404 of the Clean Water Act, Ecology must certify to the permitting agency, the U.S. Army Corps of Engineers (USACE), that the proposed project will not violate water quality standards. In order to make such a determination, Ecology may do a more specific review of the potential impacts of a stormwater discharge from the construction phase of the project and from the completed project. As a result of that review, Ecology may condition its certification to require application of the minimum requirements in this volume, or more stringent requirements.

R.5 Hydraulic Project Approvals (included in JARPA)

Under Chapter 77.55 RCW, the Hydraulics Act, the Washington State Department of Fish and Wildlife (WDFW) has the authority to require actions when stormwater discharges related to a project would change the natural flow or bed of state waters. The implementing mechanism is the issuance of a Hydraulics Project Approval (HPA) permit. In exercising this authority, WDFW may require application of the minimum requirements in this volume, or more stringent requirements.

R.6 Aquatic Lands Use Authorizations (included in JARPA)

The Washington State Department of Natural Resources (WDNR), as the steward of public aquatic lands, may require a stormwater outfall to have a valid use authorization, and to avoid or mitigate resource

impacts. Through its use authorizations, which are issued under authority of Chapter 79.90 through 96, and in accordance with Chapter 332-30 WAC, DNR may require application of the minimum requirements in this volume, or more stringent requirements.

R.7 Requirements Identified through Watershed/Basin Planning or Total Maximum Daily Loads

A number of the requirements of this Manual can be superseded by the adoption of ordinances and rules to implement the recommendations of watershed plans or basin plans. In accordance with the Watershed Management Act (Chapter 90.82 RCW), or the basin planning option in accordance with Chapter 400-12 WAC, the state allows the City to initiate its own watershed or basin planning processes to identify more stringent or alternative requirements. As long as the actions or requirements identified in those plans and implemented through local or state ordinances or rules comply with applicable state and federal statutes, they can supersede the requirements in this Manual. The decisions concerning whether such locally derived requirements comply with federal and state statutes rest with the regulatory agencies responsible for implementing those statutes.

A requirement of this Manual can also be superseded or added to through the adoption of actions and requirements identified in a Total Maximum Daily Load (TMDL) that is approved by the U.S. EPA. However, it is likely that at least some TMDLs will require use of the BMPs in this Manual.

R.8 Underground Injection Control Authorizations

To implement provisions of the Safe Drinking Water Act, Ecology has adopted rules (Chapter 173-218 WAC) for an underground injection control program. Depending upon the manner in which it is accomplished, the discharge of stormwater into the ground can be classified as an underground injection control system. Additional information on underground injection control and how it applies to infiltration and stormwater management is included in Volume III, Section 3.4.

R.9 Washington State Department of Ecology Requirements for the Discharge of Process Wastewaters Directly to Surface Waters

If a public sanitary sewer is not available, process wastewater may be discharged, after suitable treatment, to a surface water body like a lake or stream, or to a drainage field. If the discharge is to a surface water body, Ecology must be contacted to obtain approval of the type and design of the treatment system, as well as the design and location of the outfall and the need for an NPDES permit. If a septic tank and drainfield are used for treatment, requirements of the Snohomish Health District will also apply; contact the On-Site Sewage Program directly at (253) 798-6470 for more information.

Ecology's requirements can be found at WAC Chapter 173-240. Some of the specific requirements include:

1. An engineering report must be prepared describing the proposed project. The general contents of the engineering report are specified by Ecology (WAC Chapter 173-240). The report is reviewed and approved by Ecology.
2. The treatment system must be designed in accordance with *Criteria for Sewage Works Design*, October 1985, by Ecology.
3. The outfall must be designed in accordance with specific dilution zone dimensions (WAC Chapter 173-201A-100).

4. The quality of the discharge into the receiving water must be treated and diluted (according to the dilution criteria noted above) so as to not result in a violation of water quality standards (WAC Chapter 173-201A).
5. The treatment plant must be properly maintained and operated by a certified operator (WAC Chapter 173-230).

R.10 Ecology Requirements for Dangerous Waste Generators

The state dangerous waste regulations (WAC Chapter 173-303) cover accumulation, storage, transportation, treatment, and disposal. Of interest to this volume is the temporary accumulation of waste until taken from the site to a permitted disposal site. Only portions of those regulations that apply to temporary storage are summarized here.

Permitted Generators

Businesses that generate 220 pounds or more of waste, either per batch or in the aggregate, over 1 month must comply with the storage specifications outlined below:

If placed in containers:

1. If the container is not in good condition (for example, severe rusting or apparent structural defects) or if it begins to leak, the owner must replace the container.
2. The container must be labeled as to its contents.
3. The container must be lined with a material that does not react with the waste.
4. The container must be kept closed except when adding or removing waste.
5. The container must not be opened, handled, or stored in a manner which may cause a rupture or leak.
6. At least weekly examine the containers for leakage.
7. Containers storing reactive or ignitable waste must meet requirements of the Uniform Fire Code.
8. Incompatible wastes must be stored separately.
9. Ecology may require secondary containment of the storage area. Specifically, the storage area must:
 - a. Be capable of collecting and holding spills and leaks.
 - b. If uncovered, be capable of handling a 25-year recurrence interval storm.
 - c. Have a base that is free of cracks or gaps and is sufficiently impervious to leaks, spills, and rainfall.
 - d. Be sloped or designed so that liquids can drain to a point for removal.
 - e. Have positive drainage control (e.g., a valve) to ensure containment until any liquid is removed, which must occur in a timely manner.
 - f. Have a holding capacity equal to 10 percent of the volume of all containers or the volume of the largest container, whichever is greater.
 - g. Not allow run-on of rainfall from areas adjacent to the storage area.

If the waste does not contain free liquids, the above requirements need not be met, provided that the area is sloped or the containers are elevated.

If placed in tanks:

1. The tank must be lined with a material that does not react with the waste.
2. The tank, tank area, and its ancillary equipment must be inspected according to a written schedule.
3. If retired, the tank is to be cleaned of all contents, and those contents properly disposed of.
4. Tanks storing reactive or ignitable waste must meet the Uniform Fire Code.
5. Incompatible wastes must be stored separately.

The generators must have a designated employee on site or on call with the responsibility for coordinating all emergency response measures. Spills are to be contained and cleaned up as soon as practicable.

Small-Quantity Waste Generators

These are businesses that generate less than 220 pounds of dangerous waste per month or per batch (or 2.2 pounds of extremely hazardous waste). Small-quantity generators still fall under Ecology regulations to the extent that the materials must be properly stored on site until shipment. The wastes must be moved from the property whenever the accumulated quantity equals or exceeds 220 pounds or whenever the material has resided on site for 180 days. The waste must be disposed of at an approved facility. If the business is in compliance with these requirements, they are also considered solid waste generators, and are regulated by the Snohomish Health District. For technical assistance and site visits, contact the Snohomish Health District at (425) 339-5200 or the City of Tacoma at (253) 591-5588. Regulations governing small-quantity generators are currently being reviewed to possibly raise the accumulation limit. Call the Hazardous Waste Line at 1-800-287-6429 for the most up-to-date information.

Dangerous Waste Spill Plans

A recent state law established the requirement that generators of dangerous wastes in excess of 220 lbs/month (2,640 lbs/year) prepare a waste reduction plan, called a spill plan. The required content of the plan is set forth in *Pollution Prevention Planning - Guidance Manual*, January 1992, publication No. 91-2, for WAC Chapter 173-307.

Many of the actions described in these plans may benefit stormwater quality and thus should be integrated into any decisions about the selection of the BMPs described in Chapters 4 and 5 of this volume.

See WAC Chapters 173-303 and -307 for further details, as well as the above-named publication.

R.11 Minimum Functional Standards for Containers (Snohomish Health District)

The Snohomish Health District establishes standards on the use and integrity of solid waste containers such as dumpsters. These regulations must meet or exceed the State Minimum Functional Standards, WAC 173-304-200.

R.12 Ecology Requirements for Underground and Aboveground Storage Tanks

Underground Storage Tanks

Underground storage tanks (UST) that contain fuel and other petroleum products are regulated by Ecology under **WAC Chapter 173-360 Underground Storage Tank Regulations**. This law applies to USTs that have a capacity of greater than 110 gallons. USTs which store federally listed or otherwise regulated hazardous waste, heating fuel on the premises where used, farm or residential USTs less than 1,100 gallons in size and other types are exempt from these regulations (WAC Chapter 173-360-110).

The state UST regulations require permits for USTs in use after July 1991. Specific performance criteria such as design, integrity testing, inventory control, UST performance monitoring, spill control, and reporting for new USTs are outlined in this regulation. USTs in existence prior to adoption of this regulation in 1990 must meet the upgrade criteria or new UST requirements by 1998 or complete closure of the system.

USTs that have been closed or taken out of service after December 1988 must complete closure (removal or in-place closure) in accordance with WAC Chapter 173-360. Requirements for UST closure with Ecology include submittal of a 30-day notice of closure, site assessment, and completion of any applicable cleanup actions. A report of the closure actions must be submitted to Ecology.

Aboveground Storage Tanks

Aboveground storage tanks (AST) which store dangerous wastes are regulated under **WAC Chapter 173-303 Dangerous Waste Regulations**, which is administered by Ecology. Underground storage tanks which store dangerous wastes must also meet the criteria for tanks in this regulation. Businesses which store, handle or generate dangerous wastes are regulated under this regulation based on the volume of dangerous waste generated. The Dangerous Waste Regulations have specific requirements for AST integrity, corrosion protection, secondary containment, leak detection, and use and management criteria, in addition to general requirements for businesses that have dangerous wastes.

For ASTs which contain other types of materials such as petroleum products or raw materials, Ecology guidance document *Guidelines to Prevent, Control, and Contain Spills from the Bulk Storage of Petroleum Products* is available for technical guidance.

Inquiries about business-specific requirements and permitting for USTs and ASTs should be directed to Ecology, Southwest Regional Office at (360) 407-6300.

R.13 U.S. EPA and Washington State Department of Ecology Emergency Spill Cleanup Requirements

USEPA – Spill Prevention Control and Cleanup Plans (40 CFR 112)

This federal regulation requires that owners or operators of facilities engaged in drilling, producing, gathering, storing, processing, refining, transferring, or consuming oil and oil products are required to have a Spill Prevention and Control and Cleanup Plan (SPCC), provided that the facility is not transportation related; and, that the aboveground storage of a single container is in excess of 660 gallons, or an aggregate capacity greater than 1,320 gallons, or a total below ground capacity in excess of 42,000 gallons.

The plan must:

1. Be well thought out in accordance with good engineering.
2. Achieve three objectives - prevent spills, contain spills that occur, cleanup spills.

3. Identify name, location, owner, and type of facility.
4. Have date of initial operation and oil spill history.
5. Designate the person responsible.
6. Be approved and certified by the person in authority.
7. Contain a facility analysis.
8. Tanks must have secondary containment and leak detection.

Ecology Dangerous Wastes (WAC 173-303-350)

The regulations state that generators must have a contingency plan that must include:

1. Actions taken in the event of a spill.
2. Descriptions of arrangements with local agencies.
3. Identification of the owner's emergency coordinator.
4. List of emergency equipment.
5. Evaluation plan for business personnel.

See Federal Regulation 40 CFR 112 and WAC 173-303-350 for further information.

R.14 Washington State Department of Agriculture Pesticide Regulations

Washington State pesticide laws are administered by the state's Department of Agriculture, under the Washington Pesticide Control Act (RCW Chapter 15.58), Washington Pesticide Application Act (RCW Chapter 17.21), and regulations in WAC Chapter 16.228. In Tacoma, all pest control operators and fumigators are required to obtain certification from the Snohomish Health District. Contact the Health District's Compliance Program at (253) 798-6440 for more information. The requirements relevant to water quality protection are:

1. Persons who apply pesticides are required to be licensed **except**:
 - a. People who use general-use pesticides on their own or their employer's property.
 - b. Grounds maintenance people using only general use pesticides on an occasional basis not amounting to a regular occupation.
 - c. Governmental employees who apply general use pesticides without utilizing any kind of motorized or pressurized apparatus.
 - d. Employees of a commercial applicator or a government agency who are under direct onsite supervision by a licensed applicator.
2. Licensed applicators must undergo 40 hours of continuing education to keep the license.
3. No person shall pollute streams, lakes, and other water supplies in pesticide loading, mixing, and application.
4. No person shall transport, handle, store, load, apply, or dispose of any pesticide, pesticide container, or apparatus in such a manner as to pollute water supplies or waterways, or cause damage or injury to land, human beings, desirable plants, or animals.

See WAC Chapter 16.228 for further details.

R.15 Puget Sound Clean Air Agency Air Quality Regulations

The Puget Sound region is under the jurisdiction of regional air quality authorities who in turn must function under Washington State and federal air quality regulations. The Puget Sound Clear Air Agency (PSCAA) is the regulatory agency for air quality in Tacoma.

The air authority has policies on fugitive dust and outside painting. PSCAA requires that reasonable precautions be taken to prevent fugitive particulate material from becoming airborne when handling, loading, transporting, or storing particulate material. PSCAA defines what are reasonable precautions such as: the paving of parking lots and storage areas; housekeeping measures to minimize the accumulation of mud and dust and prevent its tracking onto public roads; and stabilizing storage piles with water spray, chemical stabilizers, tarps, or enclosure.

PSCAA requires that abrasive blasting and spray painting operations be performed inside a booth designed to capture the blast grit or overspray. Outdoor blasting or painting of structures or items too large to be handled indoors is to be enclosed with tarps. Containers of solvents and coatings are to be kept closed. The *Compliance Guidelines* specify how spraying equipment is to be cleaned. It also requires an O&M plan for spray operations.

See *Compliance Guidance for Spray Coating Operations*, PSCAA.

PSCAA regulations may be viewed on the agency's Web site at: <www.pscleanair.org>.

R.16 Uniform Fire Code Requirements

Storage of flammable, ignitable and reactive chemicals and materials must comply with the stricter of the City's zoning codes, City Fire Department Codes, the Uniform Fire Code standards or the National Electric Code.

Appendix B – Quick Reference Phone Numbers and Web Sites

Environmental Protection Agency (U.S. EPA) – Region X 800-424-4372

The City:

Surface Water Management	425-257-8800
Storm Drain Complaints	425-257-8800
Sewer Industrial Pretreatment Program	425-257-8874
Environmental Programs	425-257-8800
Permit Services	425-257-8810
Planning and Development	425-257-8731

Snohomish Health District: 425-388-3411

Washington State Department of Agriculture 877-301-4555

Washington State Department of Ecology:

Northwest Regional Office	425-649-7000
Dangerous/Hazardous Waste	360-407-6700
NPDES Stormwater Permits	425-649-7000
Spill Reporting	800-424-8802
Recycling	800-732-9253
Groundwater Quality and Protection	360-407-6775
Underground and Aboveground Storage Tanks	425-649-7000

Washington State University/County Cooperative Extension 425-388-2400

Industrial Materials Exchange 206-296-4899

Puget Sound Clean Air Agency 800-552-3565

Underground Utility Locate “Call Before You Dig” 800-424-5555

Washington State Departments:

Washington State Department of Health
<<http://www.doh.wa.gov/>>

Washington Department of Fish and Wildlife
<<http://wdfw.wa.gov/>>

Washington State Government Information and Services
<<http://www.access.wa.gov/>>

Washington State Department of Ecology - Digital Coastal Atlas
<http://www.ecy.wa.gov/programs/sea/SMA/atlas_home.html>

Washington State Department of Ecology - Stormwater Home Page
<<http://www.ecy.wa.gov/programs/wq/stormwater/index.html>>

Federal Departments:

Federal Emergency Management Agency (FEMA)
<<http://fema.gov/>>

U.S. EPA Office of Water, Academy 2000
<<http://epa.gov/watertrain/>>

U.S. Geological Survey (USGS) Departments:

USGS Historical Water Resource Data
<<http://wa.water.usgs.gov/realtime/historical.html>>

USGS National Water Information System (NWISWeb)
<<http://water.usgs.gov/nwis/>>

TerraServer (zoom in on USGS aerial photos anywhere in the USA)
<<http://terraserver-usa.com/>>

Water Quality and NPDES:

Natural Resources Conservation Service (NRCS) and U.S. Department of Agriculture (USDA)
<<http://www.nrcs.usda.gov/>>

National Climatic Data Center Data Archive
<<http://www.ncdc.noaa.gov/>>

National Weather Service Hydrologic Forecasts (River Flooding)
<<http://ahps2.wrh.noaa.gov/ahps2/index.php?wfo=sew>>

USGS Real Time Gauging Info
<<http://wa.water.usgs.gov/realtime/current.html>>

U.S. Army Corps of Engineers Real Time Gauge Info
<<http://www.nwd-wc.usace.army.mil/nws/hh/basins/puy.html>>

The City:

The City Homepage
<<http://www.ci.everett.wa.us/>>

Other Agencies:

Snohomish Conservation District
<<http://www.snohomishcd.org/>>

Snohomish Health District
<<http://www.snohd.org/>>

NWS River Forecast Center - Flood Outlook
<<http://www.nwrfc.noaa.gov/river/fop.cgi>>

NOAA Tide and Current Predictions
<<http://co-ops.nos.noaa.gov/tp4days.html>>

Appendix C – Recycling/Disposal of Vehicle Fluids/Other Wastes*

	Recommended Management
Antifreeze	Store separately for resale. Separate ethylene glycol from propylene glycol for offsite recycling. If not recyclable, send to Treatment, Storage, and Disposal Facility (TSDF) for disposal.
Batteries	INTACT: Accumulate under cover prior to sale, deliver to recycler or, return to manufacturer. BROKEN: Accumulate acid from broken batteries in resistant containers with secondary containment. Send to TSDF for disposal.
Brake fluid	Accumulate in separate, marked, closed container. Do not mix with waste oil. Recycle.
Fuel	Store gasoline, and diesel separately for use or resale. Mixtures of diesel, gasoline, oil, and other fluids may not be recyclable and may require expensive disposal.
Fuel filters	Drain fluids for use as product. With approval of local landfill operator, dispose of in dumpster, if needed.
Oil filters	Puncture the filter dome and drain it for 24 hours. Put oil drained from filters into your "USED OIL ONLY" container. Keep drained filters in a separate container marked "USED OIL FILTERS ONLY." Locate a scrap metal dealer who will pick up and recycle your filters. With approval of local landfill operator, dispose of drained filters to dumpster.
Paint	Accumulate oil-based and water-based paints separately for use or resale. If not recyclable, send accumulations to TSDF for disposal.
Power steering fluid	Same as for used oils.
Shop towels/oily rags	Use cloth towels that can be laundered and reused. Accumulate used shop towels in a closed container. Sign up with an industrial laundry service that can recycle your towels.
Solvents	Consider using less hazardous solvents or switching to a spray cabinet that doesn't use solvent. Accumulate solvents separately. Consider purchasing your own solvent still and recycling solvent on site. Do not mix with used oil. Do not evaporate as a means of disposal.
Transmission oil, differential and rear end fluids	Accumulate in your "USED OIL ONLY" container. Arrange for pickup for offsite recycling.
Used oils; including, crankcase oil, transmission oil, power steering fluid and differential/rear end oil	Keep used oil in a separate container marked "USED OIL ONLY." Do not mix with brake fluid, or used antifreeze. Do not mix with any other waste if you plan to burn it in your shop for heating. Arrange for pickup for offsite recycling.
Windshield washer fluid	Accumulate separately for use or resale. Discharge to onsite sewage disposal, or, if acceptable by the City's Industrial Pretreatment Program ((425) 257-8240) discharge to sanitary sewer.

* This information was obtained from Ecology's Hazardous Waste Program.

For a copy of "Hazardous Waste Services Directory," publication No. 91-12s, Revised December 1994, listing facilities which recycle/dispose of wastes, solvents, paints, photographic wastes, refrigerants, oils, oil filters, and silver; provide spill assistance, oil/water separator cleanout service, and drum disposal/recycling; TSD facilities; and waste brokers; call Ecology's Hazardous Waste and Toxic Reduction Program at (360) 407-6721.

Appendix D – Example of an Integrated Pest Management Program

IPM is a natural, long-term, ecologically based systems approach to controlling pest populations. This system uses techniques either to reduce pest populations or maintain them at levels below those causing economic injury, or to so manipulate the populations that they are prevented from causing injury. The goals of integrated pest management are to encourage optimal selective pesticide use (away from prophylactic, broad spectrum use), and to maximize natural controls to minimize the environmental side effects.

A step-by-step comprehensive integrated pest management program is provided below as a guide.

Introduction

This section provides a sound cultural approach to managing lawns and landscapes and minimizing runoff. Many homeowners or property managers will be able to implement most or all of this approach; others will wish to hire these services out. For the do-it yourselfer, an array of resources is available to assist in the effort. Landscaping businesses, agricultural extensions, local agencies, master gardener programs, local nurseries, and the library can all provide assistance. Landscaping professionals (businesses) are particularly encouraged to practice IPM.

Definition

“IPM, or IPM, is an approach to pest control that uses regular monitoring to determine if and when treatments are needed, and employs physical, mechanical, cultural, and biological tactics to keep pest numbers low enough to prevent intolerable damage or annoyance. Least-toxic chemical controls are used as a last resort.”

True integrated pest management is a powerful approach that anticipates and prevents most problems through proper cultural practices and careful observation. Knowledge of the life cycles of the host plants and both beneficial and pest organisms is also important. The integrated pest management section of this study guide is adapted from Least Toxic Pest Management for Lawns by Sheila Daar. Following the integrated pest management process gives you the information you need to minimize damage by weeds, diseases, and pests and to treat those problems with the least toxic approaches.

The IPM Process

Step One: Correctly identify problem pests and understand their life cycle.

Learn more about the pest. Observe it and pay attention to any damage that may be occurring. Learn about the life cycle. Many pests are only a problem during certain seasons, or can only be treated effectively in certain phases of the life cycle.

Step Two: Establish tolerance thresholds for pests.

Every landscape has a population of some pest insects, weeds, and diseases. This is good because it supports a population of beneficial species that keep pest numbers in check. Beneficial organisms may compete with, eat, or parasitize disease or pest organisms. Decide on the level of infestation that must be exceeded before treatment needs to be considered. Pest populations under this threshold should be monitored but don't need treatment. For instance, European crane flies usually don't do serious damage to a lawn unless there are 25 to 40 larvae per square foot feeding on the turf in February (in normal weather years). Also, most people consider a lawn healthy and well maintained even with up to 20 percent weed cover, so treatment, other than continuing good maintenance practices, is generally unnecessary.

Step Three: Monitor to detect and prevent pest problems.

Regular monitoring is a key practice to anticipate and prevent major pest outbreaks. It begins with a visual evaluation of the lawn or landscape's condition. Take a few minutes before mowing to walk around and look for problems. Keep a notebook, record when and where a problem occurs, then monitor for it at about the same time in future years. Specific monitoring techniques can be used in the appropriate season for some potential problem pests, such as European crane fly.

Step Four: Modify the maintenance program to promote healthy plants and discourage pests.

A healthy landscape is resistant to most pest problems. Lawn aeration and overseeding along with proper mowing height, fertilization, and irrigation will help the grass out-compete weeds. Correcting drainage problems and letting soil dry out between waterings in the summer may reduce the number of crane-fly larvae that survive.

Step Five: If pests exceed the tolerance thresholds ...

Use cultural, physical, mechanical, or biological controls first. If those prove insufficient, use the chemical controls described below that have the least non-target impact. When a pest outbreak strikes (or monitoring shows one is imminent), implement integrated pest management then consider control options that are the least toxic, or have the least non-target impact. Here are two examples of an integrated pest management approach:

1. **Red thread disease** is most likely under low nitrogen fertility conditions and most severe during slow growth conditions. Mow and bag the clippings to remove diseased blades. Fertilize lightly to help the grass recover, then begin grass cycling and change to fall fertilization with a slow-release or natural-organic fertilizer to provide an even supply of nutrients. Chemical fungicides are not recommended because red thread cannot kill the lawn.
2. **Crane fly damage** is most prevalent on lawns that stay wet in the winter and are irrigated in the summer. Correct the winter drainage and/or allow the soil to dry between irrigation cycles; larvae are susceptible to drying out, so these changes can reduce their numbers. It may also be possible to reduce crane fly larvae numbers by using a power de-thatcher on a cool, cloudy day when feeding is occurring close to the surface. Studies are being conducted using beneficial nematodes that parasitize the crane fly larvae; this type of treatment may eventually be a reasonable alternative.

Only after trying suitable non-chemical control methods, or determining that the pest outbreak is causing too much serious damage, should chemical controls be considered. Research what products are available and choose a product that is the least toxic and has the least non-target impact. Refer to the operational BMPs for the use of pesticides below for guidelines on choosing, storing, and using lawn and garden chemicals.

Step Six: Evaluate and record the effectiveness of the control, and modify maintenance practices to support lawn or landscape recovery and prevent recurrence.

Keep records! Note when, where, and what symptoms occurred, or when monitoring revealed a potential pest problem. Note what controls were applied and when, and the effectiveness of the control. Monitor next year for the same problems. Review your landscape maintenance and cultural practices to see if they can be modified to prevent or reduce the problem.

A comprehensive integrated pest management program should also include the proper use of pesticides as a last resort, and vegetation/fertilizer management to eliminate or minimize the contamination of stormwater.

Appendix E – Guide Sheet 2B: Guidelines for Protection from Adverse Impacts of Modified Runoff Quantity Discharged to Wetlands

Protection of wetland plant and animal communities depends on controlling the wetland's **hydroperiod**, meaning the pattern of fluctuation of water depth and the frequency and duration of exceeding certain levels, including the length and onset of drying in the summer. A hydrologic assessment is useful to measure or estimate elements of the hydroperiod under existing **pre-development** and anticipated **post-development** conditions. This assessment should be performed with the aid of a qualified hydrologist. Post-development estimates of watershed hydrology and wetland hydroperiod must include the cumulative effect of all anticipated watershed and wetland modifications. Provisions in these guidelines pertain to the full anticipated build-out of the wetland's watershed.

This analysis hypothesizes a fluctuating water stage over time before development that could fluctuate more, both higher and lower after development; these greater fluctuations are termed **stage excursions**. The guidelines set limits on the frequency and duration of excursions, as well as on overall water level fluctuation, after development.

To determine existing hydroperiod use one of the following methods, listed in order of preference:

1. Estimation by a continuous simulation computer model--The model should be calibrated with at least one year of data taken using a continuously recording level gage under existing conditions and should be run for the historical rainfall period. The resulting data can be used to express the magnitudes of depth fluctuation, as well as the frequencies and durations of surpassing given depths. [Note: Modeling that yields high quality information of the type needed for wetland hydroperiod analysis is a complex subject. Providing guidance on selecting and applying modeling options is beyond the scope of these guidelines but is being developed by King County Surface Water Management Division and other local jurisdictions. An alternative possibility to modeling depths, frequencies, and durations within the wetland is to model durations above given discharge levels entering the wetland over various time periods (e. g., seasonal, monthly, weekly). This option requires further development.]
2. Measurement during a series of time intervals (no longer than one month in length) over a period of at least one year of the maximum water stage, using a crest stage gage, and instantaneous water stage, using a staff gage--The resulting data can be used to express water level fluctuation (WLF) during the interval as follows:

$$\text{Average base stage} = (\text{Instantaneous stage at beginning of interval} + \text{Instantaneous stage at end of interval})/2$$

$$\text{WLF} = \text{Crest stage} - \text{Average base stage}$$

Compute mean annual and mean monthly WLF as the arithmetic averages for each year and month for which data are available.

To forecast future hydroperiod use one of the following methods, listed in order of preference:

1. Estimation by the continuous simulation computer model calibrated during pre-development analysis and run for the historical rainfall period--The resulting data can be used to express the magnitudes of depth fluctuation, as well as the frequencies and durations of surpassing given depths. [Note: Post-development modeling results should generally be compared with pre-development modeling results, rather than directly with field measurements, because different

sets of assumptions underlie modeling and monitoring. Making pre- and post-development comparisons on the basis of common assumptions allows cancellation of errors inherent in the assumptions.]

2. Estimation according to general relationships developed from the Puget Sound Wetlands and Stormwater Management Program Research Program, as follows (in part adapted from Chin 1996):
 - a. Mean annual WLF is very likely (100% of cases measured) to be < 20 cm (8 inches or 0.7 ft) if total impervious area (TIA) cover in the watershed is < 6% (roughly corresponding to no more than 15% of the watershed converted to urban land use).
 - b. Mean annual WLF is very likely (89% of cases measured) to be > 20 cm if TIA in the watershed is > 21% (roughly corresponding to more than 30% of the watershed converted to urban land use).
 - c. Mean annual WLF is somewhat likely (50% of cases measured) to be > 30 cm (1.0 ft) if TIA in the watershed is > 21% (roughly corresponding to more than 30% of the watershed converted to urban land use).
 - d. Mean annual WLF is likely (75% of cases measured) to be > 30 cm, and somewhat likely (50% of cases measured) to be 50 cm (20 inches or 1.6 ft) or higher, if TIA in the watershed is > 40% (roughly corresponding to more than 70% of the watershed converted to urban land use).
 - e. The frequency of stage excursions greater than 15 cm (6 inches or 0.5 ft) above or below pre-development levels is somewhat likely (54% of cases measured) to be more than six per year if the mean annual WLF increases to > 24 cm (9.5 inches or 0.8 ft).
 - f. The average duration of stage excursions greater than 15 cm above or below pre-development levels is likely (69% of cases measured) to be more than 72 hours if the mean annual WLF increases to > 20 cm.

The following hydroperiod limits characterize wetlands with relatively high vegetation species richness and apply to all zones within all wetlands over the entire year. If these limits are exceeded, then species richness is likely to decline. If the analysis described above forecasts exceedances, one or more of the management strategies listed in step 5 should be employed to attempt to stay within the limits.

1. Mean annual WLF (and mean monthly WLF for every month of the year) does not exceed 20 cm. Vegetation species richness decrease is likely with: (1) a mean annual (and mean monthly) WLF increase of more than 5 cm (2 inches or 0.16 ft) if pre-development mean annual (and mean monthly) WLF is greater than 15 cm, or (2) a mean annual (and mean monthly) WLF increase to 20 cm or more if pre-development mean annual (and mean monthly) WLF is 15 cm or less.
2. The frequency of stage excursions of 15 cm above or below pre-development stage does not exceed an annual average of six. Note: A short-term lagging or advancement of the continuous record of water levels is acceptable. The 15 cm limit applies to the temporary increase in maximum water surface elevations (hydrograph peaks) after storm events and the maximum decrease in water surface elevations (hydrograph valley bottoms) between events and during the dry season.
3. The duration of stage excursions of 15 cm above or below pre-development stage does not exceed 72 hours per excursion. Note: A short-term lagging or advancement of the continuous record of water levels is acceptable. However, the 15 cm limit applies throughout the entire hydrograph, not just the peaks and valleys.

4. The total dry period (when pools dry down to the soil surface everywhere in the wetland) does not increase or decrease by more than two weeks in any year.
5. Alterations to watershed and wetland hydrology that may cause perennial wetlands to become **vernal** are avoided.

The following hydroperiod limit characterizes **priority peat wetlands** (bogs and fens as more specifically defined by the Washington Department of Ecology) and applies to all zones over the entire year. If this limit is exceeded, then characteristic bog or fen wetland vegetation is likely to decline. If the analysis described above forecasts exceedance, one or more of the management strategies listed in step 5 should be employed to attempt to stay within the limit.

1. The duration of stage excursions above the pre-development stage does not exceed 24 hours in any year.
2. Note: This guideline is in addition to the guidelines in #2 directly above. To apply this guideline a continuous simulation computer model needs to be employed. The model should be calibrated with data taken under existing conditions at the wetland being analyzed and then used to forecast post-development duration of excursions.

The following hydroperiod limits characterize wetlands inhabited by breeding native amphibians and apply to breeding zones during the period 1 February through 31 May. If these limits are exceeded, then amphibian breeding success is likely to decline. If the analysis described above forecasts exceedances, one or more of the management strategies listed in step 5 should be employed to attempt to stay within the limits.

1. The magnitude of stage excursions above or below the pre-development stage should not exceed 8 cm for more than 24 hours in any 30-day period.
2. Note: To apply this guideline a continuous simulation computer model needs to be employed. The model should be calibrated with data taken under existing conditions at the wetland being analyzed and then used to forecast post-development magnitude and duration of excursions.

If it is expected that the hydroperiod limits stated above could be exceeded, consider strategies such as:

1. Reduction of the level of development;
2. Increasing runoff infiltration [Note: Infiltration is prone to failure in many Puget Sound Basin locations with glacial till soils and generally requires **pretreatment** to avoid clogging. In other situations infiltrating urban runoff may contaminate groundwater. Consult the stormwater management manual adopted by the jurisdiction and carefully analyze infiltration according to its prescriptions.];
3. Increasing runoff storage capacity; and
4. Selective runoff bypass.

After development, monitor hydroperiod with a continuously recording level gauge or staff and crest stage gauges. If the applicable limits are exceeded, consider additional applications of the strategies in step 5 that may still be available. It is also recommended that goals be established to maintain key vegetation species, amphibians, or both, and that these species be monitored to determine if the goals are being met.

Appendix F – Maintenance Checklists

INSTRUCTIONS FOR USE OF MAINTENANCE CHECKLISTS

The following pages contain maintenance needs for most of the components that may be part of a drainage system. Those components that are applicable to a particular project must be contained within the project's Maintenance Plan (see Volume I, Chapter 3.2.6H). The property owner shall plan to complete a checklist for all system components on the following schedule:

- (M) Monthly from October through April.
- (A) Once in late summer (preferably September).
- (S) After any major storm (use 1 inch in 24 hours as a guideline).

Photocopies of these pages shall be used and checked off for the problems looked for each time an inspection is completed. Comments on problems found and actions taken shall be noted. Some items do not need to be looked at every time an inspection is done. The suggested frequency at the left of each item shall be used as a guideline for inspections.

The “checked” sheets shall be kept by the property owner and made available to the City upon request.

The facility-specific maintenance standards contained in this appendix are intended to be conditions for determining if maintenance actions are required as identified through inspection. They are not intended to be measures of the facility's required condition at all times between inspections. In other words, exceedance of these conditions at any time between inspections and/or maintenance does not automatically constitute a violation of these standards. However, based upon inspection observations, the inspection and maintenance schedules shall be adjusted to minimize the length of time that a facility is in a condition that requires a maintenance action.

Maintenance checklists are provided for the following types of facilities/structures:

Detention Ponds	3
Infiltration Facilities	6
Closed Detention Systems (Tanks/Vaults)	10
Control Structure/Flow Restrictor	12
Catch Basins	14
Debris Barriers (e.g., Trash Racks)	17
Energy Dissipaters	18
Typical Biofiltration Swale	21
Wet Biofiltration Swales	23
Filter Strips	24
Wet Ponds	25
Treatment Wetlands	27
Wet Vaults	31
Sand Filters (aboveground/open)	33
Sand Filters (below ground/enclosed)	35
Stormfilter™ Cast-In-Place, Precast, Linear Stormfilter Units and Catch Basin Units.	37
Baffle Oil/Water Separators (American Petroleum Institute [API] Type)	39
Coalescing Plate Oil/Water Separators	41
Fencing/Shrubbery Screen/Other Landscaping	43
Gates	44

Ecology Embankment	45
Vortechs Stormwater Treatment System.	47
Stormceptor System.	48
Filtterra.	50
CDS Media Filtration System (MFS) ®	51
Aqua Shield Aqua-Swirl.....	53
Bioretention (Swales and Planters)	54
Cistern	59
Compost Amended Soil.....	61
Vegetated Roof.....	63
Pervious Pavement	66

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Detention Ponds

		Date						
Frequency	Drainage System Feature	✓	✓	✓	✓	Problem	Conditions to Check For	Maintenance Activities and Conditions That Should Exist
M,S	General					Trash and Debris	Any trash and debris which exceed 5 cubic feet per 1,000 square feet (this is about equal to the amount of trash it would take to fill up one 32 gallon garbage can). In general, there should be no visual evidence of dumping. If less than threshold all trash and debris will be removed as part of next scheduled maintenance.	Trash and debris cleared from site.
A	General					Poisonous Vegetation and noxious weeds	Any poisonous or nuisance vegetation which may constitute a hazard to maintenance personnel or the public. Any evidence of noxious weeds as defined in the Snohomish County Noxious Weeds List. Apply requirements of adopted integrated pest management policies for the use of herbicides.	No danger of poisonous vegetation where maintenance personnel or the public might normally be. (Coordinate with the Snohomish County Health Department.) Complete eradication of noxious weeds may not be possible. Compliance with state or local eradication policies required
M,S	General					Contaminants and Pollution	Any evidence of oil, gasoline, contaminants or other pollutants	No contaminants or pollutants present. (Coordinate removal/cleanup with the City of Everett Surface Water Management 425-257-8885 and/or DOE Spill Response 800-424-8802.)
M	General					Rodent Holes	If the facility is constructed with a dam or berm, look for rodent holes or any evidence of water piping through the dam or berm.	Rodents removed and dam or berm repaired. (Coordinate with Snohomish County Health Department; coordinate with Ecology Dam Safety Office if pond exceeds 10 acre-feet.)
M	General					Beaver Dams	Beaver dam results in an adverse change in the functioning of the facility.	Facility is returned to design function. Contact the Washington Department of Fish and Wildlife to coordinate with a Nuisance Wildlife Control Operator.
A	General					Insects	When insects such as wasps and hornets interfere with maintenance activities.	Insects destroyed or removed from site. Apply insecticides in compliance with adopted integrated pest management policies.

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		Date						
Frequency	Drainage System Feature	✓	✓	✓	✓	Problem	Conditions to Check For	Maintenance Activities and Conditions That Should Exist
A	General					Tree Growth and Dense Vegetation	Tree growth and dense vegetation which impedes inspection, maintenance access or interferes with maintenance activity (i.e., slope mowing, silt removal, vactoring, or equipment movements).	Trees and vegetation that does not hinder inspection or maintenance activities. Harvested trees should be recycled into mulch or other beneficial uses (e.g., alders for firewood).
A	General					Hazard Trees	If dead, diseased, or dying trees are identified (Use a certified Arborist to determine health of tree or removal requirements)	Remove hazard trees
S	General					Performance	Check crest gauge against design expectations (see maintenance plan)	Record reading. Notify City if not meeting design performance.
M	Side Slopes of Pond					Erosion	Erosion damage over 2 inches deep where cause of damage is still present or where there is potential for continued erosion.	Slopes should be stabilized using appropriate erosion control measure(s); e.g., rock reinforcement, planting of grass, compaction.
M, S	Side Slopes of Pond					Erosion	Any erosion observed on a compacted berm embankment.	If erosion is occurring on compacted berms a licensed civil engineer should be consulted to resolve source of erosion.
M	Storage Area					Sediment	Accumulated sediment that exceeds 10 percent of the designed pond depth unless otherwise specified or affects inletting or outletting condition of the facility.	Sediment cleaned out to designed pond shape and depth; pond reseeded if necessary to control erosion. (If sediment contamination is a potential problem, sediment should be tested regularly to determine leaching potential prior to disposal.)
M	Storage Area					Liner (If Applicable)	Liner is visible and has more than three one-fourth inch holes in it.	Liner repaired or replaced. Liner is fully covered.
A	Pond Berms (Dikes)					Settlements	Any part of berm which has settled 4 inches lower than the design elevation. If settlement is apparent, measure berm to determine amount of settlement. Settling can be an indication of more severe problems with the berm or outlet works. A licensed civil engineer should be consulted to determine the source of the settlement.	Dike is built back to the design elevation.

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Frequency	Drainage System Feature	Date				Problem	Conditions to Check For	Maintenance Activities and Conditions That Should Exist
		✓	✓	✓	✓			
A	Pond Berms Over 4 ft in height (Dikes)					Tree Growth	Tree growth on berms over 4 feet in height may lead to piping through the berm which could lead to failure of the berm	Trees should be removed. If root system is small (base less than 4 inches) the root system may be left in place. Otherwise the roots should be removed and the berm restored. A licensed civil engineer should be consulted for proper berm/spillway restoration.
A	Pond Berms (Dikes)					Piping	Discernable water flow through pond berm. Ongoing erosion with potential for erosion to continue. (Recommend a Geotechnical engineer be called in to inspect and evaluate condition and recommend repair of condition.	Piping eliminated. Erosion potential eliminated.
A	Emergency Overflow/ Spillway					Tree Growth	Tree growth on emergency spillways creates blockage problems and may cause failure of the berm due to uncontrolled overtopping.	Trees should be removed. If root system is small (base less than 4 inches) the root system may be left in place. Otherwise the roots should be removed and the berm restored. A licensed civil engineer should be consulted for proper berm/spillway restoration.
A	Emergency Overflow/ Spillway					Rock Missing	Only one layer of rock exists above native soil in area 5 square feet or larger, or any exposure of native soil at the top of outflow path of spillway. (Riprap on inside slopes need not be replaced.)	Rocks and pad depth are restored to design standards.
A	Emergency Overflow/ Spillway					Erosion	Erosion damage over 2 inches deep where cause of damage is still present or where there is potential for continued erosion. Any erosion observed on a compacted berm embankment.	Slopes should be stabilized using appropriate erosion control measure(s); e.g., rock reinforcement, planting of grass, compaction. If erosion is occurring on compacted berms a licensed civil engineer should be consulted to resolve source of erosion.

If you are unsure whether a problem exists, please contact a professional engineer.

Key:

- (M) Monthly from October through April.
- (A) Once in late summer (preferably September)
- (S) After any major storm (use 1 inch in 24 hours as a guideline).

Infiltration Facilities

Frequency	Drainage System Feature	Date				Problem	Conditions to Check For	Maintenance Activities and Conditions That Should Exist
		✓	✓	✓	✓			
M,S	General					Trash and Debris	Any trash and debris which exceed 5 cubic feet per 1,000 square feet (this is about equal to the amount of trash it would take to fill up one 32 gallon garbage can). In general, there should be no visual evidence of dumping. If less than threshold all trash and debris will be removed as part of next scheduled maintenance.	Trash and debris cleared from site.
A	General					Poisonous Vegetation and noxious weeds	Any poisonous or nuisance vegetation which may constitute a hazard to maintenance personnel or the public. Any evidence of noxious weeds as defined in the Snohomish County Noxious Weeds List . (Apply requirements of adopted integrated pest management policies for the use of herbicides.)	No danger of poisonous vegetation where maintenance personnel or the public might normally be. (Coordinate with the Snohomish County Health Department) Complete eradication of noxious weeds may not be possible. Compliance with state or local eradication policies required
M,S	General					Contaminants and Pollution	Any evidence of oil, gasoline, contaminants or other pollutants	No contaminants or pollutants present. (Coordinate removal/cleanup with the City of Everett Surface Water Management 425-257-8885 and/or DOE Spill Response 800-424-8802.)
M	General					Rodent Holes	If the facility is constructed with a dam or berm, look for rodent holes or any evidence of water piping through the dam or berm.	Rodents removed and dam or berm repaired. (Coordinate with Snohomish County Health Department; coordinate with Ecology Dam Safety Office if pond exceeds 10 acre-feet.)
M	General					Beaver Dams	Beaver dam results in an adverse change in the functioning of the facility.	Facility is returned to design function. Contact the Washington Department of Fish and Wildlife to coordinate with a Nuisance Wildlife Control Operator.
A	General					Insects	When insects such as wasps and hornets interfere with maintenance activities.	Insects destroyed or removed from site. Apply insecticides in compliance with adopted integrated pest management policies.

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		Date						
Frequency	Drainage System Feature	✓	✓	✓	✓	Problem	Conditions to Check For	Maintenance Activities and Conditions That Should Exist
S	General					Performance	Check crest gauge against design expectations (see maintenance plan)	Record reading. Notify City if not meeting design performance.
M	Storage Area					Water Not Infiltrating	Water ponding in infiltration pond after rainfall ceases and appropriate time allowed for infiltration (24 hours or design infiltration time). (A percolation test pit or test of facility indicates facility is only working at 90 percent of its designed capabilities. If 2 inches or more sediment is present, remove).	Sediment is removed and/or facility is cleaned so that infiltration system works according to design.
M	Filter Bags (if applicable)					Filled with Sediment and Debris	Sediment and debris fill bag more than one-half full.	Filter bag is replaced or system is redesigned.
M,S	Rock Filters					Sediment and Debris	By visual inspection, little or no water flows through filter during heavy rain storms.	Gravel in rock filter is replaced.
A,S	Trenches					Observation Well (Use surface of trench if well is not present)	Water ponds at surface during storm events. Less than 90 percent of design infiltration rate.	Remove and Replace/Clean rock and geomembrane.
M	Ponds					Vegetation	Exceeds 18 inches.	Mow
M	Ponds					Vegetation	Bare spots.	Revegetate and stabilize immediately.
M	Side Slopes of Pond					Erosion	Erosion damage over 2 inches deep where cause of damage is still present or where there is potential for continued erosion.	Slopes should be stabilized using appropriate erosion control measure(s); e.g., rock reinforcement, planting of grass, compaction.
A	Pond Berms (Dikes)					Settlements	Any part of berm which has settled 4 inches lower than the design elevation. If settlement is apparent, measure berm to determine amount of settlement. Settling can be an indication of more severe problems with the berm or outlet works. A licensed civil engineer should be consulted to determine the source of the settlement.	Dike is built back to the design elevation.

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		Date						
Frequency	Drainage System Feature	✓	✓	✓	✓	Problem	Conditions to Check For	Maintenance Activities and Conditions That Should Exist
A	Pond Berms (Dikes)					Piping	Discernable water flow through pond berm. Ongoing erosion with potential for erosion to continue. (Recommend a Geotechnical engineer be called in to inspect and evaluate condition and recommend repair of condition.	Piping eliminated. Erosion potential eliminated.
A	General					Hazard Trees	If dead, diseased, or dying trees are identified (Use a certified Arborist to determine health of tree or removal requirements)	Remove hazard trees
A	General					Tree Growth and Dense Vegetation	Tree growth and dense vegetation which impedes inspection, maintenance access or interferes with maintenance activity (i.e., slope mowing, silt removal, vactoring, or equipment movements).	Trees and vegetation that does not hinder inspection or maintenance activities. Harvested trees should be recycled into mulch or other beneficial uses (e.g., alders for firewood).
A	Pond Berms (Dikes)					Tree Growth	Tree growth on berms over 4 feet in height may lead to piping through the berm which could lead to failure of the berm.	Trees should be removed. If root system is small (base less than 4 inches) the root system may be left in place. Otherwise the roots should be removed and the berm restored. A licensed civil engineer should be consulted for proper berm/spillway restoration.
A	Emergency Overflow/ Spillway					Tree Growth	Tree growth on emergency spillways creates blockage problems and may cause failure of the berm due to uncontrolled overtopping.	Trees should be removed. If root system is small (base less than 4 inches) the root system may be left in place. Otherwise the roots should be removed and the berm restored. A licensed civil engineer should be consulted for proper berm/spillway restoration.
A	Emergency Overflow/ Spillway					Rock Missing	Only one layer of rock exists above native soil in area 5 square feet or larger, or any exposure of native soil at the top of outflow path of spillway. (Riprap on inside slopes need not be replaced.)	Rocks and pad depth are restored to design standards.

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		Date						
Frequency	Drainage System Feature	✓	✓	✓	✓	Problem	Conditions to Check For	Maintenance Activities and Conditions That Should Exist
A	Emergency Overflow/ Spillway					Erosion	Erosion damage over 2 inches deep where cause of damage is still present or where there is potential for continued erosion. Any erosion observed on a compacted berm embankment.	Slopes should be stabilized using appropriate erosion control measure(s); e.g., rock reinforcement, planting of grass, compaction. If erosion is occurring on compacted berms a licensed civil engineer should be consulted to resolve source of erosion.
M	Presetling Ponds and Vaults					Facility or sump filled with Sediment and/or debris	6 inches or designed sediment trap depth of sediment.	Sediment is removed.

If you are unsure whether a problem exists, please contact a professional engineer.

Key:

- (M) Monthly from October through April.
- (A) Once in late summer (preferably September)
- (S) After any major storm (use 1 inch in 24 hours as a guideline).

Closed Detention Systems (Tanks/Vaults)

		Date						
Frequency	Drainage System Feature	✓	✓	✓	✓	Problem	Conditions to Check For	Maintenance Activities and Conditions That Should Exist
M	Storage Area					Plugged Air Vents	One-half of the cross-section of a vent is blocked at any point or the vent is damaged.	Vents open and functioning.
M	Storage Area					Debris and Sediment	Accumulated sediment depth exceeds 10 percent of the diameter of the storage area for one-half length of storage vault or any point depth exceeds 15 percent of diameter. (Example: 72-inch storage tank would require cleaning when sediment reaches depth of 7 inches for more than one-half length of tank.)	All sediment and debris removed from storage area.
A	Storage Area					Joints Between Tank/Pipe Section	Any openings or voids allowing material to be transported into facility. (Will require engineering analysis to determine structural stability.)	All joint between tank/pipe sections are sealed.
A	Storage Area					Tank Pipe Bent Out of Shape	Any part of tank/pipe is bent out of shape more than 10 percent of its design shape. (Review required by engineer to determine structural stability.)	Tank/pipe repaired or replaced to design.
A	Storage Area					Vault Structure Includes Cracks in Wall, Bottom, Damage to Frame and/or Top Slab	Cracks wider than one-half inch and any evidence of soil particles entering the structure through the cracks, or maintenance/inspection personnel determines that the vault is not structurally sound.	Vault replaced or repaired to design specifications and is structurally sound.
A	Storage Area					Vault Structure Includes Cracks in Wall, Bottom, Damage to Frame and/or Top Slab	Cracks wider than one-half inch at the joint of any inlet/outlet pipe or any evidence of soil particles entering the vault through the walls	No cracks more than one-fourth inch wide at the joint of the inlet/outlet pipe.
A	Manhole					Cover Not in Place	Cover is missing or only partially in place. Any open manhole requires maintenance.	Manhole is closed.

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		Date						
Frequency	Drainage System Feature	✓	✓	✓	✓	Problem	Conditions to Check For	Maintenance Activities and Conditions That Should Exist
A	Manhole					Locking Mechanism Not Working	Mechanism cannot be opened by one maintenance person with proper tools. Bolts into frame have less than one-half inch of thread (may not apply to self-locking lids).	Mechanism opens with proper tools.
A	Manhole					Cover Difficult to Remove	One maintenance person cannot remove lid after applying normal lifting pressure. Intent is to keep cover from sealing off access to maintenance.	Cover can be removed and reinstalled by one maintenance person.
A	Manhole					Ladder Rungs Unsafe	Ladder is unsafe due to missing rungs, misalignment, not securely attached to structure wall, rust, or cracks.	Ladder meets design standards. Allows maintenance person safe access.

If you are unsure whether a problem exists, please contact a professional engineer.

Tanks and vaults are a confined space. Visual inspections should be performed aboveground. If entry is required it should be performed by qualified personnel.

Key:

- (M) Monthly from October through April.
- (A) Once in late summer (preferably September).
- (S) After any major storm (use 1 inch in 24 hours as a guideline).

Control Structure/Flow Restrictor

		Date						
Frequency	Drainage System Feature	✓	✓	✓	✓	Problem	Conditions to Check For	Maintenance Activities and Conditions That Should Exist
M	General					Trash and Debris (Includes Sediment)	Material exceeds 25 percent of sump depth or 1 foot below orifice plate.	Control structure orifice is not blocked. All trash and debris removed.
A	General					Structural Damage	Structure is not securely attached to manhole wall.	Structure securely attached to wall and outlet pipe.
A	General					Structural Damage	Structure is not in upright position (allow up to 10 percent from plumb).	Structure in correct position.
A	General					Structural Damage	Connections to outlet pipe are not watertight and show signs of rust.	Connections to outlet pipe are water tight; structure repaired or replaced and works as designed.
A	General					Structural Damage	Any holes—other than designed holes—in the structure.	Structure has no holes other than designed holes.
A	Cleanout Gate					Damaged or Missing	Cleanout gate is not watertight or is missing.	Gate is watertight and works as designed.
A	Cleanout Gate					Damaged or Missing	Gate cannot be moved up and down by one maintenance person.	Gate moves up and down easily and is watertight.
A	Cleanout Gate					Damaged or Missing	Chain/rod leading to gate is missing or damaged.	Chain is in place and works as designed.
A	Cleanout Gate					Damaged or Missing	Gate is rusted over 50 percent of its surface area.	Gate is repaired or replaced to meet design standards.
A	Orifice Plate					Damaged or Missing	Control device is not working properly due to missing, out of place, or bent orifice plate.	Plate is in place and works as designed.
M,S	Orifice Plate					Obstructions	Any trash, debris, sediment, or vegetation blocking the plate.	Plate is free of all obstructions and works as designed.
M,S	Overflow Pipe					Obstructions	Any trash or debris blocking (or having the potential of blocking) the overflow pipe.	Pipe is free of all obstructions and works as designed.
A	Manhole					Cover Not in Place	Cover is missing or only partially in place. Any open manhole requires maintenance.	Manhole is closed.

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		Date						
Frequency	Drainage System Feature	✓	✓	✓	✓	Problem	Conditions to Check For	Maintenance Activities and Conditions That Should Exist
A	Manhole					Locking Mechanism Not Working	Mechanism cannot be opened by one maintenance person with proper tools. Bolts into frame have less than one-half inch of thread (may not apply to self-locking lids).	Mechanism opens with proper tools.
A	Manhole					Cover Difficult to Remove	One maintenance person cannot remove lid after applying normal lifting pressure. Intent is to keep cover from sealing off access to maintenance.	Cover can be removed and reinstalled by one maintenance person.
A	Manhole					Ladder Rungs Unsafe	Ladder is unsafe due to missing rungs, misalignment, not securely attached to structure wall, rust, or cracks.	Ladder meets design standards. Allows maintenance person safe access.

If you are unsure whether a problem exists, please contact a professional engineer.

Control structures are usually considered a confined space. Visual inspections should be performed aboveground. If entry is required it should be performed by qualified personnel.

Key:

(M) Monthly from October through April.

(A) Once in late summer (preferably September)

(S) After any major storm (use 1 inch in 24 hours as a guideline).

Catch Basins

		Date						
Frequency	Drainage System Feature	✓	✓	✓	✓	Problem	Conditions to Check For	Maintenance Activities and Conditions That Should Exist
A	General					"Dump no pollutants" Stencil or stamp not visible	Stencil or stamp should be visible and easily read	Warning signs (e.g., "Dump No Waste-Drains to Stream") shall be painted or embossed on or adjacent to all storm drain inlets.
M,S	General					Trash and Debris	Trash or debris which is located immediately in front of the catch basin opening or is blocking inletting capacity of the basin by more than 10 percent.	No trash or debris located immediately in front of catch basin or on grate opening.
M	General					Trash and Debris	Trash or debris (in the basin) that exceeds 60 percent of the sump depth as measured from the bottom of basin to invert of the lowest pipe into or out of the basin, but in no case less than a minimum of 6 inches clearance from the debris surface to the invert of the lowest pipe.	No trash or debris in the catch basin.
M	General					Trash and Debris	Trash or debris in any inlet or outlet pipe blocking more than one-third of its height.	Inlet and outlet pipes free of trash or debris.
M	General					Trash and Debris	Dead animals or vegetation that could generate odors that could cause complaints or dangerous gases (e.g., methane).	No dead animals or vegetation present within the catch basin.
M	General					Sediment	Sediment (in the basin) that exceeds 60 percent of the sump depth as measured from the bottom of basin to invert of the lowest pipe into or out of the basin, but in no case less than a minimum of 6 inches clearance from the sediment surface to the invert of the lowest pipe.	No sediment in the catch basin
A	General					Structure Damage to Frame and/or Top Slab	Top slab has holes larger than 2 square inches or cracks wider than one-fourth inch (intent is to make sure no material is running into basin).	Top slab is free of holes and cracks.

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		Date						
Frequency	Drainage System Feature	✓	✓	✓	✓	Problem	Conditions to Check For	Maintenance Activities and Conditions That Should Exist
A	General					Structure Damage to Frame and/or Top Slab	Frame not sitting flush on top slab, i.e., separation of more than three-fourth inch of the frame from the top slab. Frame not securely attached.	Frame is sitting flush on the riser rings or top slab and firmly attached.
A	General					Fractures or Cracks in Basin Walls/ Bottom	Maintenance person judges that structure is unsound.	Basin replaced or repaired to design standards.
A	General					Fractures or Cracks in Basin Walls/ Bottom	Grout fillet has separated or cracked wider than one-half-inch and longer than 1 foot at the joint of any inlet/outlet pipe or any evidence of soil particles entering catch basin through cracks.	Pipe is re-grouted and secure at basin wall.
A	General					Settlement/ Misalignment	If failure of basin has created a safety, function, or design problem.	Basin replaced or repaired to design standards.
M	General					Vegetation	Vegetation growing across and blocking more than 10 percent of the basin opening.	No vegetation blocking opening to basin.
M	General					Vegetation	Vegetation growing in inlet/outlet pipe joints that is more than 6 inches tall and less than 6 inches apart.	No vegetation or root growth present.
M	General					Contamination and Pollution	Any evidence of oil, gasoline, contaminants or other pollutants.	No contaminants or pollutants present. (Coordinate removal/cleanup with the City of Everett Surface Water Management 425-257-8885 and/or DOE Spill Response 800-424-8802.)
A	Catch Basin Cover					Cover Not in Place	Cover is missing or only partially in place.	Any open catch basin requires maintenance. Catch basin cover is closed
A	Catch Basin Cover					Locking Mechanism Not Working	Mechanism cannot be opened by one maintenance person with proper tools. Bolts into frame have less than one-half-inch of thread.	Mechanism opens with proper tools.

		Date						
Frequency	Drainage System Feature	✓	✓	✓	✓	Problem	Conditions to Check For	Maintenance Activities and Conditions That Should Exist
A	Catch Basin Cover					Cover Difficult to Remove	One maintenance person cannot remove lid after applying normal lifting pressure. (Intent is keep cover from sealing off access to maintenance.)	Cover can be removed by one maintenance person.
A	Ladder					Ladder Rungs Unsafe	Ladder is unsafe due to missing rungs, not securely attached to basin wall, misalignment, rust, cracks, or sharp edges.	Ladder meets design standards and allows maintenance person safe access.
	Grates					Grate opening Unsafe	Grate with opening wider than seven-eighths of an inch.	Grate opening meets design standards.
M,S	Grates					Trash and Debris	Trash and debris that is blocking more than 20 percent of grate surface inletting capacity.	Grate free of trash and debris.
A	Grates					Damaged or Missing.	Grate missing or broken member(s) of the grate.	Grate is in place and meets design standards.

If you are unsure whether a problem exists, please contact a professional engineer.

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CITY OF EVERETT STORMWATER MANAGEMENT MANUAL

Debris Barriers (e.g., Trash Racks)

		Date						
Frequency	Drainage System Feature	✓	✓	✓	✓	Problem	Conditions to Check For	Maintenance Activities and Conditions That Should Exist
M, S	General					Trash and Debris	Trash or debris that is plugging more than 20 percent of the openings in the barrier.	Barrier cleared to design flow capacity.
A	General					Damaged/Missing Bars.	Bars are bent out of shape more than 3 inches.	Bars in place with no bends more than three-fourth inch.
A	General					Damaged/Missing Bars.	Bars are missing or entire barrier missing.	Bars in place according to design.
A	General					Damaged/Missing Bars.	Bars are loose and rust is causing 50 percent deterioration to any part of barrier.	Barrier replaced or repaired to design standards.
A	General					Inlet/Outlet Pipe	Debris barrier missing or not attached to pipe.	Barrier firmly attached to pipe.

If you are unsure whether a problem exists, please contact a professional engineer.

Key:

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Energy Dissipaters

		Date						
Frequency	Drainage System Feature	✓	✓	✓	✓	Problem	Conditions to Check For	Maintenance Activities and Conditions That Should Exist
External:								
M	Rock Pad					Missing or Moved Rock	Only one layer of rock exists above native soil in area 5 square feet or larger, or any exposure of native soil.	Rock pad replaced to design standards.
M	Rock Pad					Erosion	Soil erosion in or adjacent to rock pad.	Rock pad replaced to design standards.
M	Dispersion Trench					Pipe Plugged with Sediment	Accumulated sediment that exceeds 20 percent of the design depth.	Pipe cleaned/flushed so that it matches design.
M	Dispersion Trench					Not Discharging Water Properly	Visual evidence of water discharging at concentrated points along trench (normal condition is a "sheet flow" of water along trench). Intent is to prevent erosion damage.	Trench redesigned or rebuilt to standards.
M	Dispersion Trench					Perforations Plugged	Over one-half of perforations in pipe are plugged with debris and sediment.	Perforated pipe cleaned or replaced.
M	Dispersion Trench					Water Flows Out Top of "Distributor" Catch Basin.	Maintenance person observes or receives credible report of water flowing out during any storm less than the design storm or its causing or appears likely to cause damage.	Facility rebuilt or redesigned to standards.
M	Dispersion Trench					Receiving Area Over-Saturated	Water in receiving area is causing or has potential of causing landslide problems.	No danger of landslides.
Internal:								
M	Manhole/ Chamber					Worn or Damaged Post, Baffles, Side of Chamber	Structure dissipating flow deteriorates to one-half of original size or any concentrated worn spot exceeding 1 square foot which would make structure unsound	Structure replaced to design standards.

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		Date						
Frequency	Drainage System Feature	✓	✓	✓	✓	Problem	Conditions to Check For	Maintenance Activities and Conditions That Should Exist
M	Manhole/ Chamber					Trash and Debris	Trash or debris (in the basin) that exceeds 60 percent of the sump depth as measured from the bottom of basin to invert of the lowest pipe into or out of the basin, but in no case less than a minimum of 6 inches clearance from the debris surface to the invert of the lowest pipe.	No trash or debris in the catch basin.
M	Manhole/ Chamber					Trash and Debris	Trash or debris in any inlet or outlet pipe blocking more than one-third of its height.	Inlet and outlet pipes free of trash or debris.
M	Manhole/ Chamber					Trash and Debris	Dead animals or vegetation that could generate odors that could cause complaints or dangerous gases (e.g., methane).	No dead animals or vegetation present within the catch basin.
M	Manhole/ Chamber					Sediment	Sediment (in the basin) that exceeds 60 percent of the sump depth as measured from the bottom of basin to invert of the lowest pipe into or out of the basin, but in no case less than a minimum of 6 inches clearance from the sediment surface to the invert of the lowest pipe.	No sediment in the catch basin.
A	Manhole/ Chamber					Structure Damage to Frame and/or Top Slab	Top slab has holes larger than 2 square inches or cracks wider than one-fourth inch (intent is to make sure no material is running into basin).	Top slab is free of holes and cracks.
A	Manhole/ Chamber					Structure Damage to Frame and/or Top Slab	Frame not sitting flush on top slab, i.e., separation of more than three-fourth inch of the frame from the top slab. Frame not securely attached	Frame is sitting flush on the riser rings or top slab and firmly attached.
A	Manhole/ Chamber					Fractures or Cracks in Basin Walls/ Bottom	Maintenance person judges that structure is unsound.	Basin replaced or repaired to design standards.
A	Manhole/ Chamber					Fractures or Cracks in Basin Walls/ Bottom	Grout fillet has separated or cracked wider than one-half-inch and longer than 1 foot at the joint of any inlet/outlet pipe or any evidence of soil particles entering catch basin through cracks.	Pipe is re-grouted and secure at basin wall.

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		Date						
Frequency	Drainage System Feature	✓	✓	✓	✓	Problem	Conditions to Check For	Maintenance Activities and Conditions That Should Exist
A	Manhole/ Chamber					Settlement/ Misalignment	If failure of basin has created a safety, function, or design problem.	Basin replaced or repaired to design standards.
M	Manhole/ Chamber					Contamination and Pollution	Any evidence of oil, gasoline, contaminants or other pollutants.	No contaminants or pollutants present. (Coordinate removal/cleanup with the City of Everett Surface Water Management 425-257-8885 and/or DOE Spill Response 800-424-8802.)
A	Catch Basin Cover					Cover Not in Place	Cover is missing or only partially in place.	Any open catch basin requires maintenance. Catch basin cover is closed.
A	Catch Basin Cover					Locking Mechanism Not Working	Mechanism cannot be opened by one maintenance person with proper tools. Bolts into frame have less than one-half-inch of thread.	Mechanism opens with proper tools.
A	Catch Basin Cover					Cover Difficult to Remove	One maintenance person cannot remove lid after applying normal lifting pressure. (Intent is keep cover from sealing off access to maintenance.)	Cover can be removed by one maintenance person.

If you are unsure whether a problem exists, please contact a professional engineer.

Key:

- (M) Monthly from October through April.
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Typical Biofiltration Swale

		Date						
Frequency	Drainage System Feature	✓	✓	✓	✓	Problem	Conditions to Check For	Maintenance Activities and Conditions That Should Exist
M	General					Sediment Accumulation on Grass	Sediment depth exceeds 2 Inches or inhibits vegetation growth in 10 percent or more of swale.	Remove sediment deposits on grass treatment area of the bioswale. When finished, swale should be level from side to side and drain freely toward outlet. There should be no areas of standing water once inflow has ceased.
M	General					Standing Water	When water stands in the swale between storms and does not drain freely.	Any of the following may apply: remove sediment or trash blockages, improve grade from head to foot of swale, remove clogged check dams, add underdrains or convert to a wet biofiltration swale.
M	General					Flow spreader	Flow spreader uneven or clogged so that flows are not uniformly distributed through entire swale width.	Level the spreader and clean so that flows are spread evenly over entire swale width.
M	General					Constant Baseflow	When small quantities of water continually flow through the swale, even when the weather has been dry for weeks, and an eroded, muddy channel has formed in the swale bottom.	Add a low-flow pea-gravel drain the length of the swale or by-pass the baseflow around the swale.
M	General					Poor Vegetation Coverage	When grass is sparse or bare or eroded patches occur in more than 10 percent of the swale bottom.	Determine why grass growth is poor and correct that condition. Re-plant with plugs of grass from the upper slope: plant in the swale bottom at 8-inch intervals. Or re-seed into loosened, fertile soil.
M	General					Vegetation	When the grass becomes excessively tall (greater than 10 inches); when nuisance weeds and other vegetation starts to take over.	Mow vegetation or remove nuisance vegetation so that flow not impeded. Grass should be mowed to a height of 3 to 4 inches. Remove grass clippings.
M	General					Excessive Shading	Grass growth is poor because sunlight does not reach swale.	If possible, trim back over-hanging limbs and remove brushy vegetation on adjacent slopes.

		Date						
Frequency	Drainage System Feature	✓	✓	✓	✓	Problem	Conditions to Check For	Maintenance Activities and Conditions That Should Exist
M	General					Inlet/Outlet	Inlet/outlet areas clogged with sediment and/or debris.	Remove material so that there is no clogging or blockage in the inlet and outlet area.
M	General					Trash and Debris Accumulation	Trash and debris accumulated in the bioswale.	Remove leaves, litter, and oily materials, and re-seed or re-sod, and regrade, as needed. Clean curb cuts and level spreaders as needed.
M	General					Erosion/Scouring	Eroded or scoured swale bottom due to flow channelization, or higher flows.	For ruts or bare areas less than 12 inches wide, repair the damaged area by filling with crushed gravel. If bare areas are large, generally greater than 12 inches wide, the swale should be re-graded and re-seeded. For smaller bare areas, overseed when bare spots are evident, or take plugs of grass from the upper slope and plant in the swale bottom at 8-inch intervals.

If you are unsure whether a problem exists, please contact a professional engineer.

Key:

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Wet Biofiltration Swales

Frequency	Drainage System Feature	Date				Problem	Conditions to Check For	Maintenance Activities and Conditions That Should Exist
		✓	✓	✓	✓			
M	General					Sediment Accumulation	Sediment depth exceeds 2 inches in 10 percent of the swale treatment area.	Remove sediment deposits in treatment area.
M	General					Water Depth	Water not retained to a depth of about 4 inches during the wet season.	Build up or repair outlet berm so that water is retained in the wet swale.
M	General					Wetland Vegetation	Vegetation becomes sparse and does not provide adequate filtration, OR vegetation is crowded out by very dense clumps of cattail, which do not allow water to flow through the clumps.	Determine cause of lack of vigor of vegetation and correct. Replant as needed. For excessive cattail growth, cut cattail shoots back and compost offsite. Note: normally wetland vegetation does not need to be harvested unless die-back is causing oxygen depletion in downstream waters.
M	General					Inlet/Outlet	Inlet/outlet area clogged with sediment and/or debris.	Remove clogging or blockage in the inlet and outlet areas.
M	General					Trash and Debris Accumulation	Any trash and debris which exceed 5 cubic feet per 1,000 square feet (this is about equal to the amount of trash it would take to fill up one 32 gallon garbage can). In general, there should be no visual evidence of dumping. If less than threshold all trash and debris will be removed as part of next scheduled maintenance.	Remove trash and debris from wet swale.
M	General					Erosion/Scouring	Swale has eroded or scoured due to flow channelization, or higher flows.	Check design flows to assure swale is large enough to handle flows. By-pass excess flows or enlarge swale. Replant eroded areas with fibrous-rooted plants such as Juncus effusus (soft rush) in wet areas or snowberry (Symphoricarpos albus) in dryer areas.

If you are unsure whether a problem exists, please contact a professional engineer.

Key:

- (M) Monthly from October through April.
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Filter Strips

		Date						
Frequency	Drainage System Feature	✓	✓	✓	✓	Problem	Conditions to Check For	Maintenance Activities and Conditions That Should Exist
M	General					Sediment Accumulation on Grass	Sediment depth exceeds 2 inches.	Remove sediment deposits, re-level so slope is even and flows pass evenly through strip.
M	General					Vegetation	When the grass becomes excessively tall (greater than 10 inches); when nuisance weeds and other vegetation starts to take over.	Mow grass, control nuisance vegetation such that flow is not impeded. Grass should be mowed to a height between 3-4 inches.
M	General					Trash and Debris Accumulation	Trash and debris accumulated on the filter strip.	Remove trash and Debris from filter.
M	General					Erosion/Scouring	Eroded or scoured areas due to flow channelization, or higher flows.	For ruts or bare areas less than 12 inches wide, repair the damaged area by filling with crushed gravel. The grass will creep in over the rock in time. If bare areas are large, generally greater than 12 inches wide, the filter strip should be re-graded and re-seeded. For smaller bare areas, overseed when bare spots are evident.
M	General					Flow spreader	Flow spreader uneven or clogged so that flows are not uniformly distributed through entire filter width.	Level the spreader and clean so that flows are spread evenly over entire filter width

If you are unsure whether a problem exists, please contact a professional engineer.

Key:

- (M) Monthly from October through April.
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Wet Ponds

		Date						
Frequency	Drainage System Feature	✓	✓	✓	✓	Problem	Conditions to Check For	Maintenance Activities and Conditions That Should Exist
M	General					Water level	First cell is empty, doesn't hold water.	Line the first cell to maintain at least 4 feet of water. Although the second cell may drain, the first cell must remain full to control turbulence of the incoming flow and reduce sediment resuspension.
M						Trash and Debris	Accumulation that exceeds 1 cubic foot per 1000 square feet of pond area.	Trash and debris removed from pond
M						Inlet/Outlet Pipe	Inlet/Outlet pipe clogged with sediment and/or debris material	No clogging or blockage in the inlet and outlet piping.
M						Sediment Accumulation in Pond Bottom	Sediment accumulations in pond bottom that exceeds the depth of sediment zone plus 6 inches, usually in the first cell.	Sediment removed from pond bottom. (If sediment contamination is a potential problem, sediment should be tested regularly to determine leaching potential prior to disposal.)
M						Oil Sheen on Water	Prevalent and visible oil sheen.	Oil removed from water using oil- absorbent pads or vactor truck. Source of oil located and corrected. If chronic low levels of oil persist, plant wetland plants such as Juncus effusus (soft rush) which can uptake small concentrations of oil.
A						Erosion	Erosion of the pond's side slopes and/or scouring of the pond bottom that exceeds 6 inches, or where continued erosion is prevalent.	Slopes stabilized using proper erosion control measures and repair methods.
A						Settlement of Pond Dike/Berm	Any part of these components that has settled 4 inches or lower than the design elevation, or inspector determines dike/berm is unsound.	Dike/berm is repaired to specifications
A						Internal Berm	Berm dividing cells should be level.	Berm surface is leveled so that water flows evenly over entire length of berm.

		Date						
Frequency	Drainage System Feature	✓	✓	✓	✓	Problem	Conditions to Check For	Maintenance Activities and Conditions That Should Exist
A						Overflow Spillway	Rock is missing and soil is exposed at top of spillway or outside slope.	Rocks replaced to specifications.

If you are unsure whether a problem exists, please contact a professional engineer.

Key:

(M) Monthly from October through April.

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Treatment Wetlands

		Date						
Frequency	Drainage System Feature	✓	✓	✓	✓	Problem	Conditions to Check For	Maintenance Activities and Conditions That Should Exist
B	General					Trash and Debris	Any trash and debris accumulations which exceed 5 cubic feet per 1,000 square feet (this is a little more than the amount of trash it would take to fill up one standard 32 gallon garbage can). In general, there should be no visual evidence of dumping. If there is less than the threshold, remove all trash and debris as part of the next scheduled maintenance.	Trash and debris cleared from site.
B	General					Poisonous Vegetation and Noxious Weeds	Any poisonous or nuisance vegetation which may constitute a hazard to maintenance personnel or the public. Any evidence of noxious weeds as defined in the Snohomish County Noxious Weeds List . (Apply requirements of adopted integrated vegetation management (IVM) policies for the use of herbicides.)	No danger of poisonous vegetation where maintenance personnel or the public might have contact. (Coordinate with the Snohomish County Noxious Weed Coordinator.) Complete eradication of noxious weeds may not be possible, however compliance with state or local eradication policies are required.
B	General					Oil Sheen on Water	Prevalent and visible oil sheen.	Oil removed from water using oil- absorbent pads or vactor truck. Source of oil located and corrected. If chronic low levels of oil persist, plant emergent wetland plants such as Juncus effusus (soft rush) which can assist filtering small concentrations of oil.
B, S	General					Inlet/Outlet Pipe	Inlet/Outlet pipe clogged with sediment and/or debris material or damaged.	No clogging or blockage in the inlet and outlet piping.
B	General					Rodent Holes	If the facility is constructed with a dam or berm, look for rodent holes or any evidence of water piping through the dam or berm.	Rodents removed and dam or berm repaired. (Coordinate with Snohomish County Health Department for rodent removal; coordinate with Ecology Dam Safety Office if pond exceeds 10 acre-feet.)

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		Date						
Frequency	Drainage System Feature	✓	✓	✓	✓	Problem	Conditions to Check For	Maintenance Activities and Conditions That Should Exist
B	General					Beaver Dams	Beaver dam results in an adverse change in the functioning of the facility.	Facility is fully functioning. Contact the Washington Department of Fish and Wildlife to coordinate with a Nuisance Wildlife Control Operator.
B	General					Tree Growth and Hazard Trees	Tree growth that impedes maintenance access.	Trees do not hinder maintenance activities. Harvested trees should be recycled into mulch or other beneficial uses (e.g., firewood or construction).
B	General					Tree Growth and Hazard Trees	If dead, diseased, or dying trees are identified, use a certified Arborist to determine the health of tree and whether removal is required.	Remove hazard trees.
B	General					Liner	Liner is visible and has more than three one-fourth inch holes in it.	Liner is repaired or replaced. Liner is fully covered.
B	Forebay					Sediment Accumulation	Sediment accumulation in forebay exceeds the design depth of the sediment zone plus 6 inches.	Accumulated sediment is removed from forebay bottom to the design depth of the sediment zone.
B	Side Slopes of Wetland					Erosion	Erosion damage over 2 inches deep where cause of damage is still present or where there is potential for continued erosion.	Slopes should be stabilized using appropriate erosion control measure(s) such as rock reinforcement, planting of grass, or additional compaction.
B, S	Side Slopes of Wetland					Erosion	Any erosion observed on a compacted berm embankment.	If erosion is occurring on compacted berms a licensed civil engineer should be consulted to resolve source of erosion.
B	Wetland Cell					Wetland Vegetation	20 percent or more of the constructed wetland area has dead or dying vegetation, as measured by stem counts relative to the design plant coverage.	Dead or dying vegetation is replaced by like species, unless recommended otherwise by the Wetlands Consultant and approved by the City. (Watering, physical support, mulching, and weed removal may be required on a regular basis especially during the first 3 years.)

CITY OF EVERETT STORMWATER MANAGEMENT MANUAL

		Date						
Frequency	Drainage System Feature	✓	✓	✓	✓	Problem	Conditions to Check For	Maintenance Activities and Conditions That Should Exist
B	Wetland Cell					Wetland Vegetation	Percent vegetated cover of constructed wetland bottom area, excluding exotic and invasive species, is less than 50 percent after 2 years.	Remove exotic/invasive species provide additional plantings may be required
B	Wetland Cell					Wetland Vegetation	Decaying vegetation produces foul odors.	Decaying vegetation is removed, preferably in late summer.
C	Wetland Cell					Wetland Vegetation	Wetland vegetation is blocking flow paths causing flow back-up and flooding.	Areas of blocking vegetation are cut back sufficient to allow design flows and prevent flooding.
A	Wetland Cell					Wetland Vegetation	Water quality monitoring indicates that wetland vegetation is contributing phosphorus and metals to downstream waters rather than sequestering them.	To maximize removal of wetland pollutants, wetland vegetation must be periodically harvested, particularly with respect to phosphorus and metals removal. Harvesting should occur by mid-summer before plants begin to transfer phosphorus from the aboveground foliage to subsurface roots, or begin to lose metals that desorb during plant die off. Every 3 to 5 years the entire plant mass including roots should be harvested because the below ground biomass constitutes a significant reservoir (as much as half) of the nutrients and metals that are removed from stormwater by plants.
B	Wetland Cell					Sediment Accumulation	Sediment accumulation inhibits growth of wetland plants or reduces wetland volume (greater than 1 feet of sediment accumulation).	Dredge.
A	Wetland Berms (Dikes)					Settlements	Any part of berm which has settled 4 inches lower than the design elevation. If settlement is apparent, measure berm to determine amount of settlement. Settling can be an indication of more severe problems with the berm or outlet works. A licensed civil engineer should be consulted to determine the source of the settlement.	Dike restored to the design elevation.

CITY OF EVERETT STORMWATER MANAGEMENT MANUAL

		Date						
Frequency	Drainage System Feature	✓	✓	✓	✓	Problem	Conditions to Check For	Maintenance Activities and Conditions That Should Exist
A	Wetland Berms (Dikes)					Piping	Discernable water flow through pond berm. Ongoing erosion with potential for erosion to continue. (Recommend a geotechnical engineer be called in to inspect and evaluate condition and recommend repairs.	Piping eliminated. Erosion potential eliminated.
A	Wetland Berms Over 4 ft in height (Dikes)					Tree Growth	Tree growth on berms over 4 feet in height may lead to piping through the berm which could lead to failure of the berm	Trees should be removed. If root system is small (base less than 4 inches) the root system may be left in place. Otherwise the roots should be removed and the berm restored. A licensed civil engineer should be consulted for proper berm/spillway restoration.
A	Emergency Overflow/ Spillway					Obstruction	Tree growth or other blockage on emergency spillways may cause failure of the berm due to uncontrolled overtopping.	Obstruction should be removed. A licensed civil engineer should be consulted for proper berm/spillway restoration.
A	Emergency Overflow/ Spillway					Rock Missing	Only one layer of rock exists above native soil in an area 5 square feet or larger, or any exposure of native soil at the top of outflow path of spillway. (Riprap on inside slopes need not be replaced.)	Rocks and pad depth are restored to design standards.
A	Emergency Overflow/ Spillway					Erosion	Erosion damage over 2 inches deep where cause of damage is still present or where there is potential for continued erosion. Any erosion observed on a compacted berm embankment.	Slopes should be stabilized using appropriate erosion control measure(s); e.g., rock reinforcement, planting of grass, compaction. If erosion is occurring on compacted berms a licensed civil engineer should be consulted to resolve source of erosion.

If you are unsure whether a problem exists, please contact a professional engineer.

Key:

- (M) Monthly from October through April.
- (A) Once in late summer (preferably September)
- (B) Biannually (once during growing season, once during non-growing season)
- (C) Once in midsummer (late July or early August)
- (S) After any major storm (use 1 inch in 24 hours as a guideline).

CITY OF EVERETT STORMWATER MANAGEMENT MANUAL

Wet Vaults

		Date						
Frequency	Drainage System Feature	✓	✓	✓	✓	Problem	Conditions to Check For	Maintenance Activities and Conditions That Should Exist
M	General					Trash/Debris Accumulation	Trash and debris accumulated in vault, pipe or inlet/outlet (includes floatables and non-floatables).	Remove trash and debris from vault.
M	General					Sediment Accumulation in Vault	Sediment accumulation in vault bottom exceeds the depth of the sediment zone plus 6 inches.	Remove sediment from vault. (If sediment contamination is a potential problem, sediment should be tested regularly to determine leaching potential prior to disposal.)
A	General					Damaged Pipes	Inlet/outlet piping damaged or broken and in need of repair.	Pipe repaired and/or replaced.
A	General					Access Cover Damaged/Not Working	Cover cannot be opened or removed, especially by one person.	Pipe repaired or replaced to proper working specifications.
M	General					Ventilation	Ventilation area blocked or plugged.	Blocking material removed or cleared from ventilation area. A specified percentage of the vault surface area must provide ventilation to the vault interior (see design specifications).
A	Vault Structure					Damage - Includes Cracks in Walls Bottom, Damage to Frame and/or Top Slab	Maintenance/inspection personnel determine that the vault is not structurally sound	Vault replaced or repairs made so that vault meets design specifications and is structurally sound.
A	Vault Structure					Damage - Includes Cracks in Walls Bottom, Damage to Frame and/or Top Slab	Cracks wider than one-half-inch at the joint of any inlet/outlet pipe or evidence of soil particles entering through the cracks.	Vault repaired so that no cracks exist wider than one-fourth inch at the joint of the inlet/outlet pipe.
A	Vault Structure					Baffles	Baffles corroding, cracking, warping and/or showing signs of failure as determined by maintenance/inspection staff.	Baffles repaired or replaced to specifications.

		Date						
Frequency	Drainage System Feature	✓	✓	✓	✓	Problem	Conditions to Check For	Maintenance Activities and Conditions That Should Exist
A	Access Ladder					Damage	Ladder is corroded or deteriorated, not functioning properly, not attached to structure wall, missing rungs, has cracks and/or misaligned. Confined space warning sign missing.	Ladder replaced or repaired to specifications, and is safe to use as determined by inspection personnel. Replace sign warning of confined space entry requirements.

If you are unsure whether a problem exists, please contact a professional engineer.

A vault is a confined space. Visual inspections should be performed aboveground. If entry is required it should be performed by qualified personnel.

Key:

- (M) Monthly from October through April.
- (A) Once in late summer (preferably September)
- (S) After any major storm (use 1 inch in 24 hours as a guideline).

Sand Filters (aboveground/open)

		Date						
Frequency	Drainage System Feature	✓	✓	✓	✓	Problem	Conditions to Check For	Maintenance Activities and Conditions That Should Exist
M	Above ground (open sand filter)					Sediment Accumulation on top layer	Sediment depth exceeds one-half inch.	No sediment deposit on grass layer of sand filter that would impede permeability of the filter section.
M	Above ground (open sand filter)					Trash and Debris Accumulations	Trash and debris accumulated on sand filter bed.	Trash and debris removed from sand filter bed.
M	Above ground (open sand filter)					Sediment/ Debris in Clean-Outs	When the clean-outs become fully or partially plugged with sediment and/or debris.	Sediment removed from clean-outs.
M	Above ground (open sand filter)					Sand Filter Media	Drawdown of water through the sand filter media takes longer than 24-hours, and/or flow through the overflow pipes occurs frequently.	Top several inches of sand are scraped. May require replacement of entire sand filter depth depending on extent of plugging (a sieve analysis is helpful to determine if the lower sand has too high a proportion of fine material). Other options include removal of thatch, aerating the filter surface, tilling the filter surface, replacing the top 4 inches of filter media, and inspecting geotextiles for clogging.
M	Above ground (open sand filter)					Prolonged Flows	Sand is saturated for prolonged periods of time (several weeks) and does not dry out between storms due to continuous base flow or prolonged flows from detention facilities. (Consider 4-8 hour drawdown tests)	Low, continuous flows are limited to a small portion of the facility by using a low wooden divider or slightly depressed sand surface.
M	Above ground (open sand filter)					Short Circuiting	Drawdown greater than 12 inches per hour. When flows become concentrated over one section of the sand filter rather than dispersed. (Consider 4-8 hour drawdown tests)	Flow and percolation of water through sand filter is uniform and dispersed across the entire filter area.

		Date						
Frequency	Drainage System Feature	✓	✓	✓	✓	Problem	Conditions to Check For	Maintenance Activities and Conditions That Should Exist
M	Above ground (open sand filter)					Erosion Damage to Slopes	Erosion over 2 inches deep where cause of damage is prevalent or potential for continued erosion is evident.	Slopes stabilized using proper erosion control measures.
A	Above ground (open sand filter)					Rock Pad Missing or Out of Place	Soil beneath the rock is visible.	Rock pad replaced or rebuilt to design specifications.
M	Above ground (open sand filter)					Flow Spreader	Flow spreader uneven or clogged so that flows are not uniformly distributed across sand filter. Rills and gullies on the surface of the filter can indicate improper function of the inlet flow spreader.	Spreader leveled and cleaned so that flows are spread evenly over sand filter.
M	Above ground (open sand filter)					Damaged Pipes	Any part of the piping that is crushed or deformed more than 20 percent or any other failure to the piping.	Pipe repaired or replaced.

If you are unsure whether a problem exists, please contact a professional engineer.

Key:

- (M) Monthly from October through April.
- (A) Once in late summer (preferably September)
- (S) After any major storm (use 1 inch in 24 hours as a guideline).

CITY OF EVERETT STORMWATER MANAGEMENT MANUAL

Sand Filters (below ground/enclosed)

Frequency	Drainage System Feature	Date				Problem	Conditions to Check For	Maintenance Activities and Conditions That Should Exist
		✓	✓	✓	✓			
M	Below Ground Vault					Sediment Accumulation on Sand Media Section	Sediment depth exceeds one-half inch.	No sediment deposits on sand filter section that which would impede permeability of the filter section.
M	Below Ground Vault					Sediment Accumulation in Presettling Portion of Vault	Sediment accumulation in vault bottom exceeds the depth of the sediment zone plus 6 inches.	No sediment deposits in first chamber of vault.
M	Below Ground Vault					Trash/Debris Accumulation	Trash and debris accumulated in vault, or pipe inlet/outlet, floatables and non-floatables.	Trash and debris removed from vault and inlet/outlet piping.
M	Below Ground Vault					Sediment in Drain Pipes/Cleanouts	When drain pipes, cleanouts become full with sediment and/or debris.	Sediment and debris removed.
M	Below Ground Vault					Clogged Sand Filter Media	Drawdown of water through the sand filter media takes longer than 24-hours, and/or flow through the overflow pipes occurs frequently. (Consider 4-8 hour drawdown tests.)	Top several inches of sand are scraped. May require replacement of entire sand filter depth depending on extent of plugging (a sieve analysis is helpful to determine if the lower sand has too high a proportion of fine material). Other options include removal of thatch, aerating the filter surface, tilling the filter surface, and replacing the top 4 inches of filter media.
M	Below Ground Vault					Short Circuiting	Drawdown greater than 12 inches per hour. When seepage/flow occurs along the vault walls and corners. Sand eroding near inflow area. (Consider 4-8 hour drawdown tests.)	Sand filter media section re-laid and compacted along perimeter of vault to form a semi-seal. Erosion protection added to dissipate force of incoming flow and curtail erosion.
A	Below Ground Vault					Damaged Pipes	Inlet or outlet piping damaged or broken and in need of repair.	Pipe repaired and/or replaced.
M	Below Ground Vault					Flow Spreader	Flow spreader uneven or clogged so that flows are not uniformly distributed across sand filter.	Spreader leveled and cleaned so that flows are spread evenly over sand filter.

Frequency	Drainage System Feature	Date				Problem	Conditions to Check For	Maintenance Activities and Conditions That Should Exist
		✓	✓	✓	✓			
M	Below Ground Vault					Ventilation	Ventilation area blocked or plugged	Blocking material removed or cleared from ventilation area. A specified percentage of the vault surface area must provide ventilation to the vault interior (see design specifications).
A	Below Ground Vault					Access Cover Damaged/Not Working	Cover cannot be opened, corrosion/deformation of cover. Maintenance person cannot remove cover using normal lifting pressure.	Cover repaired to proper working specifications or replaced.
A	Below Ground Vault					Vault Structure Damaged; Includes Cracks in Walls, Bottom, Damage to Frame and/or Top Slab.	Cracks wider than one-half inch or evidence of soil particles entering the structure through the cracks, or maintenance/inspection personnel determine that the vault is not structurally sound.	Vault replaced or repairs made so that vault meets design specifications and is structurally sound.
A	Below Ground Vault					Vault Structure Damaged; Includes Cracks in Walls, Bottom, Damage to Frame and/or Top Slab.	Cracks wider than one-half inch at the joint of any inlet/outlet pipe or evidence of soil particles entering through the cracks.	Vault repaired so that no cracks exist wider than one-fourth inch at the joint of the inlet/outlet pipe.
A	Below Ground Vault					Baffles/Internal walls	Baffles or walls corroding, cracking, warping and/or showing signs of failure as determined by maintenance/inspection person.	Baffles repaired or replaced to specifications.
A	Below Ground Vault					Access Ladder	Damaged Ladder is corroded or deteriorated, not functioning properly, not securely attached to structure wall, missing rungs, cracks, and misaligned.	Ladder replaced or repaired to specifications, and is safe to use as determined by inspection personnel.

If you are unsure whether a problem exists, please contact a professional engineer.

A below ground enclosed sand filter is a confined space. Visual inspections should be performed aboveground. If entry is required it should be performed by qualified personnel.

Key:

(M) Monthly from October through April.

(A) Once in late summer (preferably September)

(S) After any major storm (use 1 inch in 24 hours as a guideline).

CITY OF EVERETT STORMWATER MANAGEMENT MANUAL

Stormfilter™ Cast-In-Place, Precast, Linear Stormfilter Units and Catch Basin Units.

Also check DOE website and manufacturer guidelines for updates to O&M requirements.

Frequency	Drainage System Feature	Date				Problem	Conditions to Check For	Maintenance Activities and Conditions That Should Exist
		✓	✓	✓	✓			
M	Media filter vault					Sediment accumulation on top of filter cartridges	Sediment accumulation exceeds 0.25 inches on top of cartridges.	No sediment deposits on top of cartridges. Sediment on cartridges likely indicates that cartridges are plugged and require maintenance.
M	Media filter vault					Sediment accumulation in vault	Sediment accumulation in vault exceeds 0.5 inches. Look for other indicators of clogged cartridges or overflow.	Sediment in vault should be removed. Cartridges should be checked and replaced or serviced as needed.
M	Media filter vault					Trash and floatable debris accumulation	Trash and floatable debris accumulation in vault	No trash or other floatable debris in filter vault.
S	Media filter vault					Filter cartridges submerged	Filter vault does not drain within 24 hours following storm. Look for evidence of submergence due to backwater or excessive hydrocarbon loading.	Filter media checked and replaced if needed. If cartridges are plugged with oil additional treatment or source control BMP may be needed.
M	Forebay					Sediment accumulation	Sediment accumulation exceeds 6 inches or one-third of the available sump.	Sediment accumulation less than 6 inches.
M	Forebay					Trash and floatable debris accumulation	Trash and/or floatable debris accumulation.	Trash and/or floatable debris should be removed during monthly inspections. Significant oil accumulation may indicate the need for additional treatment or source control.
A	Drain Pipes/Cleanouts					Sediment in Drain Pipes/Clean-Outs	When drain pipes, clean-outs, become full with sediment and/or debris.	Sediment and debris removed.
A	Below ground vault					Access cover Damaged/ Not working	One maintenance person cannot remove lid after applying 80 pounds of lift, corrosion of deformation of cover.	Cover repaired to proper working specifications or replaced.
A	Below ground vault					Damaged Pipes	Any part of the pipes are crushed or damaged due to corrosion and/or settlement.	Pipe repaired or replaced.

CITY OF EVERETT STORMWATER MANAGEMENT MANUAL

		Date						
Frequency	Drainage System Feature	✓	✓	✓	✓	Problem	Conditions to Check For	Maintenance Activities and Conditions That Should Exist
A	Below ground vault					Vault structure has cracks in wall, bottom, and damage to frame and/or top slab.	Cracks wider than one-half inch or evidence of soil particles entering the structure through the cracks, or maintenance/inspection personnel determine that the vault is not structurally sound.	Vault repaired or replaced so that vaults meets design specifications and is structurally sound.
A	Below ground vault					Vault structure has cracks in wall, bottom, and damage to frame and/or top slab.	Cracks wider than 0.5 inch at the joint of any inlet/outlet pipe or evidence of soil particles entering through the cracks	Vault repaired so that no cracks exist wider than 0.25 inch at the joint of inlet/outlet pipe.
A	Below ground vault					Baffles	Baffles corroding, cracking , warping, and/or showing signs of failure as determined by maintenance/inspection person	Baffles repaired or replaced to design specifications.
A	Below ground vault					Ladder rungs unsafe	Maintenance person judges that ladder is unsafe due to missing rungs, misalignment, rust, or cracks. Ladder must be fixed or secured immediately.	Ladder meets design standards and allows maintenance persons safe access.
S	Below Ground Cartridge Type					Compost Media	Drawdown of water through the media takes longer than 1 hour, and/or overflow occurs frequently.	Media cartridges replaced.
S	Below Ground Cartridge Type					Short Circuiting	Flows do not properly enter filter cartridges.	Filter cartridges replaced.

If you are unsure whether a problem exists, please contact a professional engineer.

A vault is a confined space. Visual inspections should be performed aboveground. If entry is required it should be performed by qualified personnel.

Key:

- (M) Monthly from October through April.
- (A) Once in late summer (preferably September)
- (S) After any major storm (use 1 inch in 24 hours as a guideline).

CITY OF EVERETT STORMWATER MANAGEMENT MANUAL

Baffle Oil/Water Separators (American Petroleum Institute [API] Type)

		Date						
Frequency	Drainage System Feature	✓	✓	✓	✓	Problem	Conditions to Check For	Maintenance Activities and Conditions That Should Exist
M,S	Monitoring					Inspection of discharge water for obvious signs of poor water quality.	Sheen, obvious oil present	Effluent discharge from vault should be clear without thick visible sheen.
M,S	Monitoring					Sediment Accumulation	Sediment depth in bottom of vault exceeds 6 inches in depth.	No sediment deposits on vault bottom that would impede flow through the vault and reduce separation efficiency.
M,S	Monitoring					Trash and Debris Accumulation	Trash and debris accumulation in vault, or pipe inlet/outlet, floatables and non-floatables.	Trash and debris removed from vault, and inlet/outlet piping.
M,S	Monitoring					Oil Accumulation	Oil accumulations that exceed 1 inch, at the surface of the water or 6 inches of sludge in the sump.	Extract oil/sludge from vault by vactoring. Disposal in accordance with state and local rules and regulations.
A	Structure					Damaged Pipes	Inlet or outlet piping damaged or broken and in need of repair.	Pipe repaired or replaced.
A	Structure					Access Cover Damaged/Not Working	Cover cannot be opened, corrosion/deformation of cover.	Cover repaired to proper working specifications or replaced.
A	Structure					Vault Structure Damage Includes Cracks in Walls Bottom, Damage to Frame and/or Top Slab	Maintenance person judges that structure is unsound.	Vault replaced or repairs made so that vault meets design specifications and is structurally sound.
A	Structure					Vault Structure Damage Includes Cracks in Walls Bottom, Damage to Frame and/or Top Slab	Cracks wider than one-half inch at the joint of any inlet/outlet pipe or evidence of soil particles entering through the cracks.	Vault repaired so that no cracks exist wider than one-fourth inch at the joint of the inlet/outlet pipe.

		Date						
Frequency	Drainage System Feature	✓	✓	✓	✓	Problem	Conditions to Check For	Maintenance Activities and Conditions That Should Exist
A	Structure					Baffles	Baffles corroding, cracking, warping and/or showing signs of failure as determined by maintenance/inspection person.	Baffles repaired or replaced to specifications.
A	Structure					Access Ladder Damaged	Ladder is corroded or deteriorated, not functioning properly, not securely attached to structure wall, missing rungs, cracks, and misaligned.	Ladder replaced or repaired and meets specifications, and is safe to use as determined by inspection personnel.

If you are unsure whether a problem exists, please contact a professional engineer.

An oil/water separator vault is a confined space. Visual inspections should be performed aboveground. If entry is required it should be performed by qualified personnel.

Key:

- (M) Monthly from October through April.
- (A) Once in late summer (preferably September)
- (S) After any major storm (use 1 inch in 24 hours as a guideline).

CITY OF EVERETT STORMWATER MANAGEMENT MANUAL

Coalescing Plate Oil/Water Separators

		Date						
Frequency	Drainage System Feature	✓	✓	✓	✓	Problem	Conditions to Check For	Maintenance Activities and Conditions That Should Exist
M,S	General					Monitoring	Inspection of discharge water for obvious signs of poor water quality.	Effluent discharge from vault should be clear with no thick visible sheen.
M,S	General					Sediment Accumulation	Sediment depth in bottom of vault exceeds 6 inches in depth and/or visible signs of sediment on plates.	No sediment deposits on vault bottom and plate media, which would impede flow through the vault and reduce separation efficiency.
M,S	General					Trash and Debris Accumulation	Trash and debris accumulated in vault, or pipe inlet/outlet, floatables and non-floatables.	Trash and debris removed from vault, and inlet/outlet piping.
M,S	General					Oil Accumulation	Oil accumulation that exceeds 1 inch at the water surface.	Oil is extracted from vault using vactoring methods. Dispose of in accordance with state and local rules and regulations. Coalescing plates are cleaned by thoroughly rinsing and flushing. Direct wash-down effluent to the sanitary sewer system where permitted. Should be no visible oil depth on water.
A	Structure					Damaged Coalescing Plates	Plate media broken, deformed, cracked and/or showing signs of failure.	A portion of the media pack or the entire plate pack is replaced depending on severity of failure.
A	Structure					Damaged Pipes	Inlet or outlet piping damaged or broken and in need of repair.	Pipe repaired and or replaced.
A	Structure					Baffles	Baffles corroding, cracking, warping and/or showing signs of failure as determined by maintenance/inspection person.	Baffles repaired or replaced to specifications.
A	Structure					Vault Structure Damage - Includes Cracks in Walls, Bottom, Damage to Frame and/or Top Slab	Cracks wider than one-half inch or evidence of soil particles entering the structure through the cracks, or maintenance/inspection personnel determine that the vault is not structurally sound.	Vault replaced or repairs made so that vault meets design specifications and is structurally sound.

		Date						
Frequency	Drainage System Feature	✓	✓	✓	✓	Problem	Conditions to Check For	Maintenance Activities and Conditions That Should Exist
A	Structure					Vault Structure Damage - Includes Cracks in Walls, Bottom, Damage to Frame and/or Top Slab	Cracks wider than one-half inch at the joint of any inlet/outlet pipe or evidence of soil particles entering through the cracks.	Vault repaired so that no cracks exist wider than one-fourth inch at the joint of the inlet/outlet pipe.
A	Structure					Access Ladder Damaged	Ladder is corroded or deteriorated, not functioning properly, not securely attached to structure wall, missing rungs, cracks, and misaligned.	Ladder replaced or repaired and meets specifications, and is safe to use as determined by inspection personnel.

If you are unsure whether a problem exists, please contact a professional engineer.

An oil/water separator vault is a confined space. Visual inspections should be performed aboveground. If entry is required it should be performed by qualified personnel.

Key:

(M) Monthly from October through April.

(A) Once in late summer (preferably September)

(S) After any major storm (use 1 inch in 24 hours as a guideline).

CITY OF EVERETT STORMWATER MANAGEMENT MANUAL

Fencing/Shrubbery Screen/Other Landscaping

Frequency	Drainage System Feature	Date				Problem	Conditions to Check For	Maintenance Activities and Conditions That Should Exist
		✓	✓	✓	✓			
M	General					Missing or broken parts/dead shrubbery	Any defect in the fence or screen that permits easy entry to a facility.	Fence is mended or shrubs replaced to form a solid barrier to entry.
M,S	General					Erosion	Erosion has resulted in an opening under a fence that allows entry by people or pets.	Replace soil under fence so that no opening exceeds 4 inches in height.
M	General					Unruly Vegetation	Shrubbery is growing out of control or is infested with weeds. See also the Snohomish County Noxious Weeds List at: www1.co.snohomish.wa.us/Department/Public_Works/Divisions/Road_Maintenance/Noxious-Weeds/weeds_list.htm	Shrubbery is trimmed and weeded to provide appealing aesthetics. Do not use chemicals to control weeds.
A	Fences					Damaged Parts	Posts out of plumb more than 6 inches.	Posts plumb to within 1.5 inches of plumb.
A	Fences					Damaged Parts	Top rails bent more than 6 inches.	Top rail free of bends greater than 1 inch.
A	Fences					Damaged Parts	Any part of fence (including posts, top rails, and fabric) more than 1 foot out of design alignment.	Fence is aligned and meets design standards.
A	Fences					Damaged Parts	Missing or loose tension wire.	Tension wire in place and holding fabric.
A	Fences					Damaged Parts	Missing or loose barbed wire that is sagging more than 2.5 inches between posts.	Barbed wire in place with less than three-fourth inch sag between posts.
A	Fences					Damaged Parts	Extension arm missing, broken, or bent out of shape more than 1.5 inches.	Extension arm in place with no bends larger than three-fourth inch.
A	Fences					Deteriorated Paint/ Protective Coating	Part or parts that have a rusting or scaling condition that has affected structural adequacy.	Structurally adequate posts or parts with a uniform protective coating.
M	Fences					Openings in Fabric	Openings in fabric are such that an 8-inch diameter ball could fit through.	No openings in fabric.

If you are unsure whether a problem exists, please contact a professional engineer.

Key: (M) Monthly from October through April.

(A) Once in late summer (preferably September)

(S) After any major storm (use 1 inch in 24 hours as a guideline).

Gates

		Date						
Frequency	Drainage System Feature	✓	✓	✓	✓	Problem	Conditions to Check For	Maintenance Activities and Conditions That Should Exist
M	General					Damaged or Missing Components	Gate is broken, jammed, or missing.	Pond has a functioning gate to allow entry of people and maintenance equipment such as mowers and backhoe. If a lock is used, make sure the City field staff have a key.
M	General					Damaged or Missing Components	Broken or missing hinges such that gate cannot be easily opened and closed by one maintenance person.	Hinges intact and lubed. Gate is working freely.
A	General					Damaged or Missing Components	Gate is out of plumb more than 6 inches and more than 1 foot out of design alignment.	Gate is aligned and vertical.
A	General					Damaged or Missing Components	Missing stretcher bands, and ties.	Stretcher bar, bands, and ties in place.

If you are unsure whether a problem exists, please contact a professional engineer.

Key:

(M) Monthly from October through April.

(A) Once in late summer (preferably September)

(S) After any major storm (use 1 inch in 24 hours as a guideline).

Ecology Embankment

		Date						
Frequency	Drainage System Feature	✓	✓	✓	✓	Problem	Conditions to Check For	Maintenance Activities and Conditions That Should Exist
M	No Vegetation Zone adjacent to pavement					Erosion, Scour, or Vehicular Damage	No vegetation zone uneven or clogged so that flows are not uniformly distributed.	Level the area and clean so that flows are spread evenly.
M	No Vegetation Zone adjacent to pavement					Sediment Accumulation on Edge of Pavement	Flows no longer sheeting off of roadway. Sediment accumulation on pavement edge exceeds top of pavement elevation.	Remove sediment deposits such that flows can sheet off of roadway.
M	Vegetated Filter					Sediment Accumulation on Grass	Sediment depth exceeds 2 inches.	Remove sediment deposits, re-level so slope is even and flows pass evenly through Ecology Embankment.
M	Vegetated Filter					Excessive Vegetation or Undesirable Species	When the grass becomes excessively tall; when nuisance weeds and other vegetation starts to take over or shades out desirable vegetation growth characteristics. See also the Snohomish County Noxious Weeds List at: www1.co.snohomish.wa.us/Department/Public_Works/Divisions/Road_Maintenance/Noxious-Weeds/weeds_list.htm	Mow grass, control nuisance vegetation, such that flow not impeded. Grass should be mowed to a height that encourages dense even herbaceous growth.
M	Vegetated Filter					Erosion, Scour, or Vehicular Damage	Eroded or scoured areas due to flow channelization, high flows or vehicular damage.	For ruts or bare areas less than 12 inches wide, repair the damaged area by filling with suitable topsoil. The grass will creep in over the rock in time. If bare areas are large, generally greater than 12 inches wide, the filter strip should be re-graded and re-seeded. For smaller bare areas, overseed when bare spots are evident.

CITY OF EVERETT STORMWATER MANAGEMENT MANUAL

		Date						
Frequency	Drainage System Feature	✓	✓	✓	✓	Problem	Conditions to Check For	Maintenance Activities and Conditions That Should Exist
M	Media Bed					Erosion, Scour, or Vehicular Damage	Eroded or scoured areas due to flow channelization, high flows or vehicular damage.	For ruts or areas less than 12 inches wide, repair the damaged area by filling with suitable media. If bare areas are large, generally greater than 12 inches wide, the media bed should be re-graded.
M	Media Bed					Sediment Accumulation on Media Bed	Sediment depth inhibits free infiltration of water.	Remove sediment deposits, re-level so slope is even and flows pass freely through Media Bed.
M	Underdrains					Sediment	Depth of sediment within perforated pipe exceeds one-half inch.	Flush underdrains through access ports and collect flushed sediment.
M	General					Trash and Debris Accumulation	Trash and debris which exceed 5 cubic feet per 1,000 square feet (this is about equal to the amount of trash it would take to fill up one 32 gallon garbage can). In general, there should be no visual evidence of dumping. If less than threshold all trash and debris will be removed as part of next scheduled maintenance.	Remove trash and debris.
M	General					Flows are Bypassing Ecology Embankment	Evidence of significant flows downslope (rills, sediment, vegetation damage, etc.) of Ecology Embankment.	Remove sediment deposits, re-level so slope is even and flows pass evenly through Ecology Embankment. If Ecology Embankment is completely clogged it may require a more extensive repair or replacement.

If you are unsure whether a problem exists, please contact a professional engineer.

Key:

- (M) Monthly from October through April.
- (A) Once in late summer (preferably September)
- (S) After any major storm (use 1 inch in 24 hours as a guideline).

Vortechs Stormwater Treatment System.

Also check DOE website and manufacturer guidelines for updates to O&M requirements.

Frequency	Drainage System Feature	Date				Problem	Conditions to Check For	Maintenance Activities and Conditions That Should Exist
		✓	✓	✓	✓			
M,S	General					Sediment accumulation	Sediment depth is within 6 inches of dry weather water surface elevation.	Accumulated sediment should be removed.
M,S	General					Trash and Debris Accumulation	Trash and debris accumulated in vault, or pipe inlet/outlet, floatables and non-floatables.	Trash and debris removed from vault, and inlet/outlet piping.
M,S	General					Oil Accumulation	Oil accumulation that exceeds 1 inch at the water surface.	Oil is extracted from vault using vactoring methods. Coalescing plates are cleaned by thoroughly rinsing and flushing. Should be no visible oil depth on water.
A	Structure					Damaged Pipes	Inlet or outlet piping damaged or broken and in need of repair.	Pipe repaired and or replaced.
A	Structure					Baffles	Baffles corroding, cracking, warping and/or showing signs of failure as determined by maintenance/inspection person.	Baffles repaired or replaced to specifications.
A	Structure					Vault Structure Damage - Includes Cracks in Walls, Bottom, Damage to Frame and/or Top Slab	Cracks wider than one-half inch or evidence of soil particles entering the structure through the cracks, including inlet/outlet pipe joints, maintenance or inspection personnel determine that the vault is not structurally sound.	Vault replaced or repairs made so that vault meets design specifications, is structurally sound, and no cracks greater than one-fourth inch exist at the inlet/outlet pipe joints

If you are unsure whether a problem exists, please contact a professional engineer.

A vault is a confined space. Visual inspections should be performed aboveground. If entry is required it should be performed by qualified personnel.

Key:

A=Annual (March or April preferred)

M=Monthly (see schedule)

S=After major storms (use 1 inch in 24 hours as a guideline)

Stormceptor System.

Also check DOE website and manufacturer guidelines for updates to O&M requirements.

		Date						
Frequency	Drainage System Feature	✓	✓	✓	✓	Problem	Conditions to Check For	Maintenance Activities and Conditions That Should Exist
M	Settling chamber					Excessive sediment Accumulation	Capacities vary depending on model number. See Table Below.	Sediments should be removed.
M	Settling chamber					Trash and Floatable Debris Accumulation	Excessive trash and floatable debris accumulation.	Minimal trash or other floatable debris.
M	Settling chamber					Excessive Oil Accumulation	Oil exceeds 6 inches in depth or evidence of a spill	Oil should be cleaned out.
M	Manhole Cover					Cover Damaged/ Not Working	One maintenance person cannot remove lid after applying 80 pounds of lift, corrosion of deformation of cover.	Cover repaired to proper working specifications or replaced.
M	Disk Insert					Disk Insert Inlet/ Outlet Obstructed	Inlet or outlet piping obstructed	Disk insert inlet/outlet free from obstructions.
A	Structure					Structure has Cracks in wall, Bottom, and Damage to Frame and/or Top Slab.	Cracks wider than one-half inch or evidence of soil particles entering the structure through the cracks, or maintenance/inspection personnel determine that the vault is not structurally sound.	Vault repaired or replaced so that vaults meets design specifications and is structurally sound.
A	Structure					Structure has Cracks at the Joint of any Inlet/ Outlet Pipe.	Cracks wider than one-half inch at the joint of any inlet/outlet pipe or evidence of soil particles entering through the cracks	Vault repaired so that no cracks exist wider than one-fourth inch at the joint of inlet/outlet pipe.

If you are unsure whether a problem exists, please contact a professional engineer or the manufacturer's representative.

Comments:

Sediment Depths Indicating Required Servicing	
Model	Sediment Depth
STC 450i	8"
STC 900	8"
STC 1200	10"
STC 1800	15"
STC 2400	12"
STC 3600	17"
STC 4800	15"
STC 6000	18"
STC 7200	15"
STC 11000	15"
STC 13000	18"
STC 16000	15"

Key:

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- (S) After any major storm (use 1 inch in 24 hours as a guideline).

Filterra®

Also check DOE website and manufacturer guidelines for updates to O&M requirements.

Frequency	Drainage System Feature	Date				Problem	Conditions to Check For	Maintenance Activities and Conditions That Should Exist
		✓	✓	✓	✓			
M	Inlet					Excessive Sediment or Trash Accumulation	Accumulated sediments or trash impair free flow of water into Filterra	Inlet should be free of obstructions allowing free distributed flow of water into Filterra. Sediments and/or trash should be removed.
M	Mulch Cover					Trash and Floatable Debris Accumulation	Excessive trash and/or debris accumulation.	Minimal trash or other debris on mulch cover. Trash and debris should be removed and mulch cover raked level.
M	Mulch Cover					Ponding of Water on Mulch Cover.	Ponding in unit could be indicative of clogging due to excessive fine sediment accumulation or spill of petroleum oils.	Stormwater should drain freely and evenly through mulch cover. Recommend contact manufacturer and replace mulch or soil if necessary.
M	Vegetation					Plants not Growing or in Poor Condition.	Soil/ mulch too wet, evidence of spill. Incorrect plant selection. Pest infestation. Vandalism to plants.	Plants should be healthy and pest free. Contact manufacturer for advice.
M	Vegetation					Plant Growth Excessive	Plants should be appropriate to the species and location of Filterra.	Trim/prune plants in accordance with manufacturers recommendations.
A	Structure					Structure has Cracks in Wall, Bottom, and Damage to Frame and/or Top Slab.	Cracks wider than one-half inch or evidence of soil particles entering the structure through the cracks, or maintenance/inspection personnel determine that the vault is not structurally sound.	Vault repaired or replaced so that vaults meets design specifications and is structurally sound.
A	Structure					Structure has Cracks at the Joint of any Inlet/ Outlet Pipe.	Cracks wider than one-half inch at the joint of any inlet/outlet pipe or evidence of soil particles entering through the cracks	Vault repaired so that no cracks exist wider than one-fourth inch at the joint of inlet/outlet pipe.

If you are unsure whether a problem exists, please contact a professional engineer or the manufacturer's representative.

Comments:

Key: (M) Monthly from October through April.

(A) Once in late summer (preferably September).

(S) After any major storm (use 1 inch in 24 hours as a guideline).

CITY OF EVERETT STORMWATER MANAGEMENT MANUAL

CDS Media Filtration System (MFS)®

Also check DOE website and manufacturer guidelines for updates to O&M requirements.

		Date						
Frequency	Drainage System Feature	✓	✓	✓	✓	Problem	Conditions to Check For	Maintenance Activities and Conditions That Should Exist
M	Media filter vault					Sediment Accumulation on Top of Filter Cartridges	Sediment accumulation exceeds one-half inch on top of cartridges.	Minimal sediment deposits on top of cartridges. Excess sediment on cartridges likely indicates that cartridges are plugged and require maintenance.
M	Media filter vault					Sediment Accumulation in Vault	Sediment accumulation in vault exceeds 6 inches.	Sediment in vault should be removed.
M	Media filter vault					Trash and Floatable Debris Accumulation	Excessive trash and floatable debris accumulation in vault.	Minimal trash or other floatable debris in filter vault.
M	Media filter cartridges					Filter Cartridges Full	Filter cartridge media appears dark. Check should be performed on a dry day. Requires entry to vault. See comments below.	Filter media checked and replaced if needed. If cartridges are plugged with oil additional treatment or source control BMP may be needed.
M	Media filter cartridges					Filter Cartridges Full	Area around cartridges has standing water and cartridges are submerged 24 hours after a storm.	Filter media checked and replaced if needed. If cartridges are plugged with oil additional treatment or source control BMP may be needed.
M	Media filter cartridges					Filter Cartridges Full	Water flowing over the head control box during light storm events and more than 1 inch of floatables has accumulated in the cartridge vent pipe.	Filter media checked and replaced if needed. If cartridges are plugged with oil additional treatment or source control BMP may be needed.
M	Access Cover					Access Cover Damaged/ Not Working	One maintenance person cannot remove lid after applying 80 pounds of lift, corrosion of deformation of cover.	Cover repaired to proper working specifications or replaced.
A	Collector manifold					Damaged Piping	Any part of the pipes are crushed or damaged due to corrosion and/or settlement.	Pipe repaired or replaced.

		Date						
Frequency	Drainage System Feature	✓	✓	✓	✓	Problem	Conditions to Check For	Maintenance Activities and Conditions That Should Exist
A	Vault					Vault Structure has Cracks in Wall, Bottom, and Damage to Frame and/or Top Slab.	Cracks wider than one-half inch or evidence of soil particles entering the structure through the cracks, or maintenance/inspection personnel determine that the vault is not structurally sound.	Vault repaired or replaced so that vaults meets design specifications and is structurally sound.
A	Vault					Structure has Cracks at the Joint of any Inlet/ Outlet Pipe.	Cracks wider than one-half inch at the joint of any inlet/outlet pipe or evidence of soil particles entering through the cracks	Vault repaired so that no cracks exist at the joint of inlet/outlet pipe.
A	Baffles					Baffles	Baffles corroding, cracking, warping, and/or showing signs of failure as determined by maintenance/inspection person.	Baffles repaired or replaced to design specifications.
A	Access Ladder					Ladder Rungs Unsafe	Maintenance person judges that ladder is unsafe due to missing rungs, misalignment, rust, or cracks. Ladder must be fixed or secured immediately.	Ladder meets design standards and allows maintenance persons safe access.

If you are unsure whether a problem exists, please contact a professional engineer.

Comments:

CDS MFS system vault is a confined space. Visual inspections should be performed aboveground. If entry is required it should be performed by qualified personnel.

Default maintenance is annual.

Configuration options include precast or cast in place concrete vaults or precast manhole structures.

Key:

(M) Monthly from October through April.

(A) Once in late summer (preferably September).

(S) After any major storm (use 1 inch in 24 hours as a guideline).

CITY OF EVERETT STORMWATER MANAGEMENT MANUAL

Aqua Shield Aqua-Swirl®

Also check DOE website and manufacturer guidelines for updates to O&M requirements.

		Date						
Frequency	Drainage System Feature	✓	✓	✓	✓	Problem	Conditions to Check For	Maintenance Activities and Conditions That Should Exist
M	Sediment Storage area					Excessive Sediment Accumulation	Sediment accumulation within 36 inches of water surface	Sediments should be removed.
M	Aqua Swirl Chamber					Trash and Floatable Debris Accumulation	Excessive trash and floatable debris accumulation swirl chamber.	Minimal trash or other floatable debris.
M	Manhole Cover					Cover Damaged/ Not Working	One maintenance person cannot remove lid after applying 80 pounds of lift, corrosion of deformation of cover.	Cover repaired to proper working specifications or replaced.
A	Structure					Vault Structure has Cracks in Wall, Bottom, and Damage to Frame and/or Top Slab.	Cracks wider than one-half inch or evidence of soil particles entering the structure through the cracks, or maintenance/inspection personnel determine that the vault is not structurally sound.	Vault repaired or replaced so that vaults meets design specifications and is structurally sound.
A	Structure					Vault Structure has Cracks at the Joint of any Inlet/ Outlet Pipe.	Cracks wider than one-half inch at the joint of any inlet/outlet pipe or evidence of soil particles entering through the cracks	Vault repaired so that no cracks exist wider than one-fourth inch at the joint of inlet/outlet pipe.
A	Baffles					Baffles	Baffles corroding, cracking, warping, and/or showing signs of failure as determined by maintenance/inspection person.	Baffles repaired or replaced to design specifications.

If you are unsure whether a problem exists, please contact a professional engineer or the manufacturer's representative.

Comments:

Key:

- (M) Monthly from October through April.
- (A) Once in late summer (preferably September).
- (S) After any major storm (use 1 inch in 24 hours as a guideline).

Bioretention (Swales and Planters)

		Date						
Frequency	Drainage System Feature	✓	✓	✓	✓	Problem	Conditions to Check For	Maintenance Activities and Conditions That Should Exist
B	Ponding Area					Cracks or Failure in concrete planter reservoir	Cracks wider than ½ inch or maintenance/inspection personnel determine that the vault is not structurally sound	Vault repaired or replaced so that vaults meets design specifications and is structurally sound.
B	Ponding Area					Failure in earthen reservoir (embankments, dikes, berms, and side slopes)	Erosion (gullies/rills) greater than 2 inches around inlets, outlet, and along side slopes.	Eliminate source of erosion and stabilize damaged area (regrade, rock, vegetation, erosion control blanket)
B	Ponding Area					Failure in earthen reservoir embankments, dikes, berms, and side slopes)	Settlement greater than 4 inches (relative to undisturbed sections of berm)	Restore to design height
A	Ponding Area					Failure in earthen reservoir (embankments, dikes, berms, and side slopes)	Downstream face of berm or embankment wet, seeps or leaks evident	Plug holes. Contact geotechnical engineer ASAP.
A	Ponding Area					Failure in earthen reservoir (embankments, dikes, berms, and side slopes)	Any evidence of rodent holes or water piping around holes if facility acts as dam or berm	Eradicate rodents/repair holes (fill and compact)
Q	Ponding Area					Sediment or debris accumulation	Accumulation of sediment or debris	Remove excess sediment or debris. Identify and control the sediment source, if feasible. Facility should be free of material. May contain standing water.
A	Ponding Area					Rockery reservoir or walls	Rock walls are insecure.	Stabilize walls

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		Date						
Frequency	Drainage System Feature	✓	✓	✓	✓	Problem	Conditions to Check For	Maintenance Activities and Conditions That Should Exist
B	Ponding Area					Basin inlet via surface flow	Soil is exposed or signs of erosion are visible.	Repair and control erosion sources
B	Ponding Area					Basin inlet via concentrated flow (e.g., curb cuts)	Sediment, vegetation, or debris partially or fully blocking inlet structure.	Clear the blockage. Identify the source of the blockage and take actions to prevent future blockages.
B	Ponding Area					Basin inlet splash block failure	Water splashes adjacent buildings.	Reconfigure/repair blocks
B	Ponding Area					Basin inlet splash block failure	Water disrupts soil media.	Reconfigure/repair blocks
B	Ponding Area					Inlet/outlet pipe failure	Pipe is damaged.	Repair/replace
B	Ponding Area					Inlet/outlet pipe failure	Pipe is clogged.	Remove roots or debris
B	Ponding Area					Outlet pipe/structure failure	Sediment, vegetation, or debris partially or fully blocking inlet structure	Clear the blockage. Identify the source of the blockage and take actions to prevent future blockages.
B	Ponding Area					Trash rack failure	Trash or debris present on trash rack.	Clean and dispose trash
B	Ponding Area					Trash rack failure	Bar screen damaged or missing.	Replace
B	Ponding Area					Check dams and Weirs failures	Sediment, vegetation, or debris partially or fully blocking check dam or weir.	Clear the blockage. Identify the source of the blockage and take actions to prevent future blockages.
B	Ponding Area					Check dams and Weirs failures	Erosion and/or undercutting is present	Repair and take preventative measures to prevent future erosion and/or undercutting
B	Ponding Area					Flow Spreader problems	Sediment blocks 35% or more of ports/notches or sediment fills 35% or more of sediment trap.	Remove and dispose
B	Ponding Area					Flow Spreader problems	Grade board/baffle damaged or not level.	Remove and reinstall to level position

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		Date						
Frequency	Drainage System Feature	✓	✓	✓	✓	Problem	Conditions to Check For	Maintenance Activities and Conditions That Should Exist
B	Ponding Area					Overflow/emergency spillway	Overflow spillway is partially or fully plugged with sediment or debris.	Remove/dispose
B	Ponding Area					Overflow/emergency spillway	Native soil is exposed or other signs of erosion damage are present.	Repair erosion and stabilize surface of spillway
B	Ponding Area					Overflow/emergency spillway	Spillway armament is missing.	Replace armament
B	Ponding Area					Bioretention soil	Water remains in the basin 48 hours or longer after the end of a storm.	Ensure that under drain (if present) is not clogged. If necessary, clear under drain. If this is not the problem, the bioretention soil is likely clogged. Remove upper 2 to 3 inches of soil and replace with imported bioretention soil. Identify sources of clogging and correct.
B	Vegetation					Bottom swale vegetation	Less than 80% of swale bottom is covered with healthy wetland vegetation.	Plant additional vegetation. Ideally, planting should be performed in the fall or winter.
B	Vegetation					Upland slope vegetation	Less than 70% of upland slopes are covered with healthy vegetation.	Plant additional vegetation. Ideally, planting should be performed in the fall or winter.
A	Vegetation					Trees and shrubs	Large trees and shrubs interfere with operation of the basin or access for maintenance.	Prune or remove large trees and shrubs
A	Vegetation					Trees and shrubs	Standing dead vegetation is present.	Remove standing dead vegetation when covering greater than 10% of basin area. Replace dead vegetation annually or immediately if necessary to control erosion (e.g., on a steep slope).
A	Vegetation					Mulch	Bare spots (without much cover) are present or mulch covers less than 3 inches deep for compost or 4 inches deep for coarse woody mulch.	Replenish mulch to cover bare spots and augment to minimum depth.
As needed	Vegetation					Clippings	Grass or other vegetation clippings accumulate to 2 inches or greater in depth.	Remove clippings

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		Date						
Frequency	Drainage System Feature	✓	✓	✓	✓	Problem	Conditions to Check For	Maintenance Activities and Conditions That Should Exist
M	Vegetation					Noxious weeds	Listed noxious vegetation is present. See the Snohomish County noxious weed list.	By law, noxious weeds must be removed and disposed immediately. It is strongly encouraged that herbicides and pesticides not be used in order to protect water quality.
Q	Vegetation					Weeds	Weeds are present (unless on edge and providing erosion control)	Remove and dispose of weed material. It is strongly encouraged that herbicides and pesticides not be used in order to protect water quality.
Based on manu- facturers instructions	Irrigation					Irrigation system (if any)	Irrigation system present.	Follow manufacturer's instructions for O&M
Weekly (May – September)	Irrigation					Plant watering	Plant establishment period (1-3 years).	Water weekly during periods of no rain to ensure plant establishment
As Needed	Irrigation					Plant watering	Longer term period (3+ years).	Water during drought conditions or more often if necessary to maintain plant cover
Ongoing	Spill Prevention and Response					Spill prevention	Storage or use of potential contaminants in the vicinity of facility.	Exercise spill prevention measures whenever handling or storing potential contaminants
As needed	Spill Prevention and Response					Spill response	Release of pollutants. Call to report any spill to the Washington Dept of Emergency Management 1-800-258-5990	Cleanup spills as soon as possible to prevent contamination of stormwater
At startup	Training and Documenta tion					Training / written guidance	Training / written guidance is required for proper O&M.	Provide property owners and tenants with proper training and a copy of the O&M Manual and Landscape and Maintenance Manual.
A	Safety					Safety (slopes)	Erosion of sides causes slope to exceed 1:4 or otherwise becomes a hazard.	Take actions to eliminate the hazard

CITY OF EVERETT STORMWATER MANAGEMENT MANUAL

		Date						
Frequency	Drainage System Feature	✓	✓	✓	✓	Problem	Conditions to Check For	Maintenance Activities and Conditions That Should Exist
A	Safety					Safety (hydraulic structures)	Hydraulic structures (pipes, culverts, vaults, etc.) become a hazard to children playing in and around the facility.	Take actions to eliminate the hazard (such as covering and securing any openings)
A	Safety					Line of sight	Vegetation causes some visibility (line of sight) or driver safety issues.	Prune
A	Aesthetics					Aesthetics	Damage/vandalism/debris accumulation.	Restore facility to original aesthetic conditions
A	Aesthetics					Grass/vegetation	Less than 75% of planted vegetation is healthy with a generally good appearance.	Take appropriate maintenance actions. (e.g., remove/replace plants, amend soil, etc.)
A	Aesthetics					Edging	Grass is starting to encroach on swale.	Repair edging
B	Pest Control					Mosquitoes	Standing water remains in the basin for more than three days following storms.	Identify the cause of the standing water and take appropriate actions to address the problem (see Bioretention Soil above)
A	Pest Control					Rodents	Rodent holes are present near the facility.	Fill and compact soil around the holes (refer to integrated pest management?)

If you are unsure whether a problem exists, please contact a professional engineer.

Comments:

Key:

- (M) Monthly from November through April.
- (A) Annually, once in late summer (preferable September)
- (S) After any major storm (use 1-inch in 24 hours as a guideline).
- (B) Biannually (spring and fall)
- (Q) Quarterly

CITY OF EVERETT STORMWATER MANAGEMENT MANUAL

Cistern

		Date						
Frequency	Drainage System Feature	✓	✓	✓	✓	Problem	Conditions to Check For	Maintenance Activities and Conditions That Should Exist
B	Collection Facilities					Roof	Debris has accumulated.	Remove debris
B	Collection Facilities					Gutter	Debris has accumulated.	Clean gutters (the most critical cleaning is in mid- to late-spring to flush the pollen deposits from surrounding trees)
A	Collection Facilities					Screens at the top of downspout and cistern inlet	Screen has deteriorated.	Replace
M	Collection Facilities					Screens at the top of downspout and cistern inlet	None. Preventative maintenance..	Clear screen of any accumulated debris
M	Collection Facilities					Low flow orifice	None. Preventative maintenance.	Clean low flow orifice
B	Collection Facilities					Overflow pipe	Pipe is damaged.	Repair/replace
B	Collection Facilities					Overflow pipe	Pipe is clogged.	Remove debris
A	Collection Facilities					Cistern	Debris has accumulated at bottom of tank	Remove debris
At startup	Training and Documentation					Training / written guidance	Training / written guidance is required for proper O&M.	Provide property owners and tenants with proper training and a copy of the O&M Manual.
Ongoing	Safety					Access and Safety	Access to cistern required for maintenance or cleaning.	Any cistern detention systems opening that could allow the entry of people must be marked: "DANGER—CONFINED SPACE"

		Date						
Frequency	Drainage System Feature	✓	✓	✓	✓	Problem	Conditions to Check For	Maintenance Activities and Conditions That Should Exist
B	Pest Control					Mosquitoes	Standing water remains for more than three days following storms.	Ensure cause of standing water is corrected. Also ensure all inlets, overflows, and other openings are protected with mosquito screens.

If you are unsure whether a problem exists, please contact a professional engineer.

Comments:

Key:

- (M) Monthly from November through April.
- (A) Annually, once in late summer (preferable September)
- (S) After any major storm (use 1-inch in 24 hours as a guideline).
- (B) Biannually (spring and fall)
- (Q) Quarterly

CITY OF EVERETT STORMWATER MANAGEMENT MANUAL

Compost Amended Soil

		Date						
Frequency	Drainage System Feature	✓	✓	✓	✓	Problem	Conditions to Check For	Maintenance Activities and Conditions That Should Exist
A	General Facility Requirements					Soil media (maintain high organic soil content)	Vegetation not fully covering ground surface.	Re-mulch landscape beds with 2-3 inches of mulch until the vegetation fully closes over the ground surface
Ongoing	General Facility Requirements					Soil media (maintain high organic soil content)	None. Preventative maintenance	Return leaf fall and shredded woody materials from the landscape to the site as mulch.
Ongoing	General Facility Requirements					Soil media (maintain high organic soil content)	None. Preventative maintenance	On turf areas, "grasscycle" (mulch-mow or leave the clippings) to build turf health
Ongoing	General Facility Requirements					Soil media (maintain high organic soil content)	None. Preventative maintenance	Avoiding broadcast use of pesticides (bug and weed killers) like "weed & feed," which damage the soil life.
A	General Facility Requirements					Soil media (maintain high organic soil content)	None. Preventative maintenance	Where fertilization is needed (mainly turf and annual flower beds), a moderate fertilization program which relies on natural organic fertilizers (like compost) or slow release synthetic balanced fertilizers.
A	General Facility Requirements					Compaction	Soils become waterlogged, do not appear to be infiltrating.	To remediate, aerate soil, till or further amend soil. If drainage is still slow, consider investigating alternative causes (e.g., high wet-season groundwater levels, low permeability soils). Also consider land use and protection from compacting activities. If areas are turf, aerate compacted areas and top dress them with ¼-½ inch of compost to renovate them.

		Date						
Frequency	Drainage System Feature	✓	✓	✓	✓	Problem	Conditions to Check For	Maintenance Activities and Conditions That Should Exist
A	General Facility Requirements					Erosion/scouring	Areas of potential erosion are visible.	Take steps to repair or prevent erosion. Identify and address the causes of erosion.
A	General Facility Requirements					Grass/vegetation	Less than 75% of planted vegetation is healthy with a generally good appearance.	Take appropriate maintenance actions (e.g., remove/replace plants)
M	General Facility Requirements					Noxious weeds	Listed noxious vegetation is present. See the Snohomish County noxious weed list.	By law, noxious weeds must be removed and disposed immediately. It is strongly encouraged that herbicides and pesticides not be used in order to protect water quality.
Q	General Facility Requirements					Weeds	Weeds are present.	Remove and dispose of weed material. It is strongly encouraged that herbicides and pesticides not be used in order to protect water quality.

If you are unsure whether a problem exists, please contact a professional engineer.

Comments:

Key:

- (M) Monthly from November through April.
- (A) Annually, once in late summer (preferable September)
- (S) After any major storm (use 1-inch in 24 hours as a guideline).
- (B) Biannually (spring and fall)
- (Q) Quarterly

Vegetated Roof

		Date						
Frequency	Drainage System Feature	✓	✓	✓	✓	Problem	Conditions to Check For	Maintenance Activities and Conditions That Should Exist
A	Soil / Growth Medium					Growth medium	Water does not permeate growth media (runs off soil surface).	Aerate or replace media
B	Soil / Growth Medium					Fallen leaves/debris	Fallen leaves or debris are present.	Remove/dispose
A	Soil / Growth Medium					Erosion/scouring	Areas of potential erosion are visible	Take steps to repair or prevent erosion. Stabilize with additional soil substrate/growth medium and additional plants.
A	System Structural Components					General	Structural components are present.	Inspect structural components for deterioration or failure. Repair/replace as necessary.
B	System Structural Components					Inlet pipe	Sediment, vegetation, or debris blocks 35% or more of inlet structure	Clear blockage. Identify and correct any problems that led to blockage.
A	System Structural Components					Inlet pipe	Inlet pipe is in poor conditions	Repair/replace
A	System Structural Components					Inlet pipe	Pipe is clogged.	Remove roots or debris.
B	Vegetation					Coverage	Vegetative coverage falls below 75% (unless design specifications stipulate less than 75% coverage).	Install more vegetation
M	Vegetation					Noxious weeds	Listed noxious vegetation is present. See the Snohomish County noxious weed list.	By law, noxious weeds must be removed and disposed immediately. It is strongly encouraged that herbicides and pesticides not be used in order to protect water quality.

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		Date						
Frequency	Drainage System Feature	✓	✓	✓	✓	Problem	Conditions to Check For	Maintenance Activities and Conditions That Should Exist
Q	Vegetation					Weeds	Weeds are present	Remove and dispose of weed material. It is strongly encouraged that herbicides and pesticides not be used in order to protect water quality.
A	Vegetation					Plants	Dead vegetation is present.	Remove dead vegetation when covering greater than 10% of basin area. Replace dead vegetation annually or immediately if necessary to control erosion.
Based on manu- facturers instructions	Irrigation					Irrigation system (if any)	Irrigation system present.	Follow manufacturer's instructions for O&M
Weekly (May – September)	Irrigation					Plant watering	Plant establishment period (1-3 years).	Water weekly during periods of no rain to ensure plant establishment
As Needed	Irrigation					Plant watering	Longer term period (3+ years).	Water during drought conditions or more often if necessary to maintain plant cover
Ongoing	Spill Prevention and Response					Spill prevention	Storage or use of potential contaminants in the vicinity of facility.	Exercise spill prevention measures whenever handling or storing potential contaminants
As needed	Spill Prevention and Response					Spill response	Release of pollutants. Call to report any spill to the Washington Dept of Emergency Management 1-800-258-5990	Cleanup spills as soon as possible to prevent contamination of stormwater
At startup	Training and Documentation					Training / written guidance	Training / written guidance is required for proper O&M.	Provide property owners and tenants with proper training and a copy of the O&M Manual and Landscape and Maintenance Manual.
A	Safety					Access and Safety	Egress and Ingress routes	Maintain egress and ingress routes to design standards and fire codes

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		Date						
Frequency	Drainage System Feature	✓	✓	✓	✓	Problem	Conditions to Check For	Maintenance Activities and Conditions That Should Exist
A	Aesthetics					Aesthetics	Damage/vandalism/debris accumulation.	Restore facility to original aesthetic conditions
A	Aesthetics					Grass/vegetation	Less than 75% of planted vegetation is healthy with a generally good appearance.	Take appropriate maintenance actions. (e.g., remove/replace plants, amend soil, etc.)
B	Pest Control					Mosquitoes	Standing water remains for more than three days following storms.	Remove standing water. Identify the cause of the standing water and take appropriate actions to address the problem (improve drainage).

If you are unsure whether a problem exists, please contact a professional engineer.

Comments:

Key:

- (M) Monthly from November through April.
- (A) Annually, once in late summer (preferable September)
- (S) After any major storm (use 1-inch in 24 hours as a guideline).
- (B) Biannually (spring and fall)
- (Q) Quarterly

Pervious Pavement

		Date						
Frequency	Drainage System Feature	✓	✓	✓	✓	Problem	Conditions to Check For	Maintenance Activities and Conditions That Should Exist
B	Surface					Pervious asphalt or cement concrete	None. Maintenance to prevent clogging with fine sediment.	Use conventional street sweepers equipped with vacuums, water, and brushes or pressure washer to restore permeability. Vacuum or pressure wash the pavement two to three times annually.
Ongoing	Surface					Pervious asphalt or cement concrete	None. Maintenance to prevent clogging with fine sediment.	Prohibit use of sand and sealant application and protect from construction runoff.
A	Surface					Pervious asphalt or cement concrete	Major cracks or trip hazards.	Fill with patching mixes. Large cracks and settlement may require cutting and replacing the pavement section.
As needed	Surface					Pervious asphalt or cement concrete	Utility cuts.	Any damage or change due to utility cuts must be replaced in kind.
B	Surface					Fallen leaves / debris	Fallen leaves or debris.	Remove/dispose.
B	Surface					Interlocking concrete paver blocks	Interlocking paving block missing or damaged.	Replace damaged paver block.
A	Surface					Interlocking concrete paver blocks	Settlement of surface.	May require resetting
B	Surface					Interlocking concrete paver blocks	Sediment or debris accumulation between paver blocks.	Remove/dispose
A	Surface					Interlocking concrete paver blocks	Loss of void material between paver blocks.	Refill per manufacturer's recommendations.

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		Date						
Frequency	Drainage System Feature	✓	✓	✓	✓	Problem	Conditions to Check For	Maintenance Activities and Conditions That Should Exist
B	Surface					Open-celled paving grid with gravel	Sediment or debris accumulation in grid voids.	Remove/dispose
A	Surface					Open-celled paving grid with gravel	Loss of soil and/or grass material in grid.	Refill and/or replant per manufacturer's recommendations.
B	Surface					Open-celled paving grid with grass	Sediment or debris accumulation in grid voids.	Remove/dispose
A	Surface					Open-celled paving grid with grass	Loss of soil and/or grass material in grid.	Refill and/or replant per manufacturer's recommendations.
Ongoing	Spill Prevention and Response					Spill prevention	Storage or use of potential contaminants in the vicinity of facility.	Exercise spill prevention measures whenever handling or storing potential contaminants
As needed	Spill Prevention and Response					Spill response	Release of pollutants. Call to report any spill to the Washington Dept of Emergency Management 1-800-258-5990	Cleanup spills as soon as possible to prevent contamination of stormwater.

If you are unsure whether a problem exists, please contact a professional engineer.

Note: For proprietary products, other varied conditions may exist. The manufacturer's product specific O&M requirements shall be performed, if any, at the recommended frequency.

Comments:

Key: (M) Monthly from November through April.

(A) Annually, once in late summer (preferable September)

(S) After any major storm (use 1-inch in 24 hours as a guideline).

(B) Biannually (spring and fall)

(Q) Quarterly

